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ABSTRACT

The fourth volume in this series contains nine contrastive studies in phonetics and phonology. They are: "Remarks on the Physical Manifestation of Internal Open Juncture in the English of Romanians," by Andrei Avram; "The Back Vowels of Romanian and English--A Contrastive Study," by Laurentia Dascalu; "Remarks on the English Diphthongs and Triphthongs as Pronounced by Native Speakers of Romanian," by Cornelia Cohut; "Notes on the Consonant [ng] in Romanian and English," by Anca Ulivi; "The Interpretation of the English Velar Nasal by Romanian Learners of English," by Hortensia Pirlog; "The New England Dialect and Romanian Listeners," by Donald B. Stoddard; "Glottal Constriction in English and Romanian," by Robert W. Bley-Vroman; "Some Remarks on Disyllabic Structures in English and Romanian," by Hortensia Pirlog; and "Observations on the Realization of Rhythm by Romanian Speakers of English," by Mariana Popa and Hortensia Pirlog. (CLK)

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THE ROMANIAN-ENGLISH CONTRASTIVE ANALYSIS PROJECT

CONTRASTIVE STUDIES IN
PHONETICS AND PHONOLOGY

BUCHAREST, UNIVERSITY PRESS

1973

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REMARKS ON THE PHYSICAL MANIFESTATION OF
INTERNAL OPEN JUNCTURE IN THE ENGLISH OF
ROMANIANS

by Andrei Avram

1. We will accept Ilse Lehiste's definition of i n t e r - n a l o p e n j u n c t u r e, and we will use the term to mean "the boundary between two bounded sequences" (Ilse Lehiste, An Acoustic-Phonetic Study of Internal Open Juncture. "Phonetica", Supplementum ad Vol.5, 1960, Basel, New York, 1960, p.48. In the following, this ample study - to which we shall often refer - will be cited by indicating the author's name only.) According to Ilse Lehiste, the contrast between t w o bounded sequences and o n e bounded sequence may be illustrated by means of the pair two lips - tulips; the terms of the pair it sprays - it's praise are made up of two bounded sequences each, but they differ in the p l a c e where the internal juncture appears (*ibid.*, p. 39-40). We shall take into account a single type of juncture, the one mentioned in the title of this article .

Ilse Lehiste, who was aiming at the discovery of "the acoustic cues which signal division of the stream of speech into smaller self-contained units" (p.14), reached the conclusion that, in most cases, the pre-junctural and post-junctural allophones of the phonemes of the sequences studied have specific phonetic features (p.39). The material she studied consisted of pairs of words or groups of words containing a contrastive open juncture, read by three subjects, who were speakers of the Midwestern type of standard American English. The material was recorded on a magnetic tape and was subjected to a minute spectrographic analysis.

2. The material studied by us comprises five pairs of words containing open juncture (in a single case one term of the pair

is a unique word). This material belongs to a longer list of words and word-groups read by three male-informants, of 20 years of age, students at the English department of the Institute for Foreign Languages of the University of Bucharest; here are some additional data on the three informants:

I. He had studied English for four years in the secondary school, and five years, in private (of which two years were intensive); he knows French and Russian (French very well).

II. He had studied English for seven years in the secondary school; he knows French and German and, to a certain extent, Hungarian.

III. He had studied English for seven years in the secondary school; he knows German and he has begun to study Danish at the University.

The following contrasted pairs were studied:

1. a name - an aim;
2. nitrate - night-rate;
3. why choose - white shoes;
4. I scream - ice cream;
5. How strained - house trained;

Broad-band spectrograms and continuous amplitude displays were made of this corpus; for part of this corpus narrow-band spectrograms were also made.

For pairs 2 and 3 we had at our disposal the results of the acoustic analysis made by Ilse Lehisté, which allowed a comparison between these results and the data obtained by us. The other 3 pairs of our material have been compared to similar pairs of the material for which the above mentioned author presents acoustic data.

5. A name - an aim. Because two of our informants pronounced the group an aim with a pause between the two elements, we measured the duration of this pause too. The durations of the segments [n] and [#] were the following (in milliseconds):

<u>A name</u>			<u>An aim</u>		
	[n]	[#]	[n]	[#]	
I.	116	-	75	-	
II	143	-	90	68	
III	113	-	98	75	

As we may note, in the pronunciation of all the three informants the initial (postjunctural) [n] was longer than the final (prejunctural) [n] (although the difference is very slight in the pronunciation of the third informant: 15 ms).

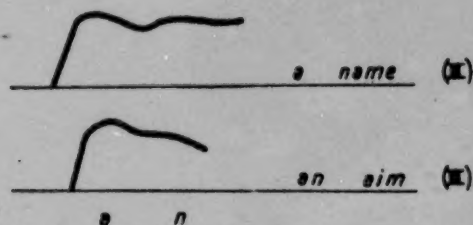


Fig.1

The intensity of [n] in name was an increasing one in all cases, but only in the pronunciation of subject II a clearly decreasing intensity of [n] in an aim could be noticed (see fig.1; the different duration of the two [n] 's can be noticed as well). In the pronunciation of subject III the initial part of the vowel [e] was laryngealised, and upon listening a glottal catch could be perceived.

The first of the distinctions mentioned above (regarding the duration of [n]) was present in the pronunciation of all the informants of Ilse Lehist in a nice man - an ice-man, and in some cases the laryngealisation of the initial vowel in ice-man was noticed too (p.20-21).

4. Nitrate - night-rate. As the word nitrate was pronounced [ni'treit] by subject II, we have at our disposal only two cases. The durations of the segments [ai] and [t] were the following:

Nitrate

	[aɪ]	[t]
I	184	68
II	145	79

Night-rate

	[aɪ]	[t]
	191	53
	210	64

From the above mentioned figures it follows that in nitrate the [t] was a bit longer than in night-rate. A difference of this kind was also noticed by Ilse Lehište (p.29-30), but, in the author's opinion, "this is perhaps a rather insignificant difference" (p.30). In the pronunciation of our subjects the main factor which separates, in English, the minimal pair nitrate - night-rate doesn't appear (the voiceless [r] in the first term, the voicing of this consonant in the second term) : our subjects pronounced a voiceless [r] in both cases.

5. Why choose - white shoes. The durations of the segments [waɪ] and [ʃ] were the following:

	[waɪ]	[t]	[ʃ]	[waɪ]	[t]	[ʃ]
		<u>Why choose</u>			<u>White shoes</u>	
I	240	56	120	244	68	158
II	338	56	158	379	68	244
III	191	83	90	158	83	173

In the pronunciation of the subjects I and II two of the differences noticed by Ilse Lehište (p.36-38) appeared: in why choose both [t] and [ʃ] were shorter in duration than in

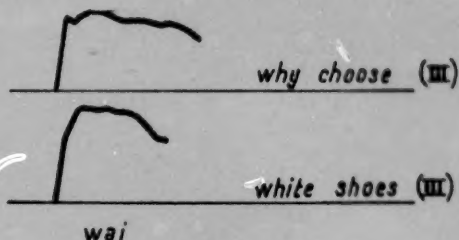


Fig.2

white shoes; in the pronunciation of subject III the occlusive element of the affricate was equal in duration to that of [t] in white, but the fricative element was much shorter than [ʃ] in

shows (96 vs. 173 ms). As regards the duration of the segment [wai], it was longer in why than in white only in the pronunciation of informant III; the difference, 33 ms, is greater than the average found by Ilse Lehieste (p.38), 20 ms.

The so-called "characteristic left-hand peak in intensity" (Ilse Lehieste, p.38) appears in why choose: after a sudden increase, the intensity gradually decreases beginning as early as the [a] component of the diphthong. In white shoes the above mentioned author noticed "a rising - falling intensity on [ai] that was rather evenly distributed" (p.38). This feature did not appear in the pronunciation of our subjects; the curve of intensity in white is quite similar to that in why (see fig.2).

6. I scream - ice cream. The durations of the segments [ai], [a] and [k] were the following:

	<u>I scream</u>			<u>Ice cream</u>		
	[ai]	[a]	[k]	[ai]	[a]	[k]
I	176	101	49	244	113	49
II	334	203	150	296	124	116
III	233	64	83	191	53	83

We must add that, in the pronunciation of subject II I and scream were separated by a pause having a duration of 98 ms.

Only in the pronunciation of the informant II and III final [ai] had a longer duration than [ai] followed by [a]. The same informants pronounced an initial [a] longer than the final [a] (as for III, the difference is very small: 11 ms).

Neither of the three subjects pronounced an initial [k] (in cream) longer than [k] in scream (even more, in the pronunciation of subject II [k] in cream was shorter than [k] in scream).

As regards the distribution of energy in the diphthong [ai], only subject III shows a clear distinction between final [ai] and non-final [ai] (see fig.3): in the first case we have a "left-hand peak in intensity" (as we have seen before, in the pronunciation of one and the same subject there is no similar difference between [wai] in why and [wai] in white).

In Ilse Lehieste's study we do not find acoustic data on the pair I scream - ice cream, but this pair may be compared, from cer-

tain points of view, with it sprays - it's praise. The above mentioned author noticed (p.26) that "[p] is followed by a period of aspiration in praise, which takes the form of a voiceless [r]", while in sprays (preceded by a non-initial voiceless

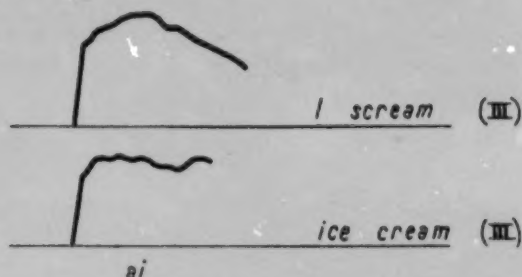


Fig.3

stop) [r] is voiced. In the pronunciation of our informants no difference of this kind is present between the liquid preceded by [k] (in cream) and the liquid preceded by the group [sk] (in scream): [r] was either voiceless in both cases (informant I and III), or voiced in both cases (informant II).

7. How strained - house trained. The durations of segments [au], [a], and [t] were the following:

	<u>How strained</u>			<u>House trained</u>		
	[au]	[a]	[t]	[au]	[a]	[t]
I	131	90	86	161	75	38
II	225	101	169	278	98	139
III	165	131	41	184	105	53

The fricative in strained had a longer duration than its correspondent in final position (in house) in the pronunciation of all three subjects (but the difference is insignificant with II). On the other hand the duration of the diphthong was longer in house than in how.

The consonant [t] was longer in initial position (in trained) than in medial position (in strained) only in the pronunciation of informant III.

As regards the distribution of energy in the diphthong [au], it is only in the pronunciation of informant I that a peculiarity appeared like that noticed by Ilse Lehiute (p. 38) for [ai] in why and in white : in final [au] (in how) the intensity clearly decreases after a climax reached in the first half of the diphthong.

The sonority of the vibrant, preceded by a voiceless occlusive appears just as in I scream - ice-cream: [r] was voiceless both in how strained and in house trained, in two cases (I and III); [r] was voiced in both terms of the contrastive pair in one case (informant II).

8. Considering the above-mentioned data, we can establish the following list of acoustic features distinguishing the minimal pairs of the type a name - an aim in the pronunciation of our informants (we shall see further on that there are some other features that must be added to this list) :

a) the duration of initial (post-junctural) and final (pre-junctural) allophones of the phonemes: the initial consonant is longer; the final diphthong is longer (we had no examples at our disposal, characterized by the contrast between a final vowel and an initial vowel; due to the fact that the indefinite article a was not preceded by a consonant, the first vowel in a name was in a special situation, which prevents us from considering it a final vowel proper, in opposition to the identical vowel phoneme in an aim);

b) the intensity of the diphthong (fast rise and slow decay in final position) and of the [a] (rise in the initial allophone, fall in the final allophone);

c) the onset of the vowel (glottal stop in initial position);

d) the duration of [t] and of [ʃ] (both elements are shorter in the affricate [tʃ] than in the sequence [t] + juncture + [ʃ]);

e) the presence of a pause.

It must be observed, from the very beginning, that none of the features a - d appears in all the cases in which these fea-

tures are normal in English (the feature e - the pause -, which is not mentioned by Ilse Lehiste as a specific feature of English in the situation under discussion appears in two cases only).

As a detail, let us mention that the difference between voiced [r] and voiceless [r] was never associated with a difference regarding the place of juncture. In the English of native speakers, in words like cream (with voiceless initial occlusive), the aspiration takes the form of a voiceless [r] (Ilse Lehiste, p.42), whereas in screen [r] preceded by a non-initial voiceless occlusive is voiced; the Romanian speakers pronounced either a voiced [r] or a voiceless [r] in both terms of the contrastive pairs nitrate - night-rate, I scream - ice cream and how strained - house trained.

9. Unlike what Ilse Lehiste ascertained, in our material generally there can be ascertained no grouping of several features that would help to point out the presence and place of the juncture. The relative poverty of the cues contained in the intrinsic acoustic features of the sounds was compensated, in some cases, by features of another nature. These features are of 3 kinds:

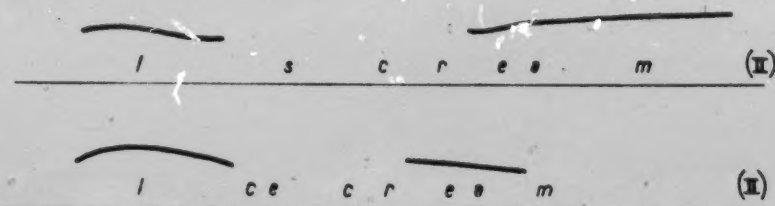


Fig.4

a) As noticed above, there existed, sometimes, a pause between an and ain and between I and scream.

b) We have found stress differences between the terms of some of the studied contrasted pairs:

Ni'trate - 'night-rate (informant III only; in the pronunciation of informant I and II, the stress was on the first syllable, in both terms of the pair);

I'scream - 'ice cream (I, II, III);

How 'strained - 'house trained (II).

c) The i n t o n a t i o n was sometimes different in the two terms of the contrasted pair. The clearest distinction appeared in the pair I scream - ice cream, in the pronunciation of informant II (rise of the tone in scream versus fall of the tone in cream; (see fig.4).

10. To what extent can the way our informants pronounced the groups of words studied lead to confusion? Without being able to give a proper answer to this question, we think we can find a first indication in the results of a test of perception. As we had no native speakers of English at our disposal, we have made a test with four Romanian listeners, acquainted with the English language (each of them has spent a year in USA). The result of this test are shown in the table below (the correct answers are marked with + and the wrong ones with - ; the sign ? shows that the listener could not make out whether he had heard the first or the second term of the pairs).

The data are presented in the order that occurred on the tape (the word groups studied occurred among other words and groups).

Table I

	I			II			III			Total		
	+	-	?	+	-	?	+	-	?	+	-	?
A name	2	2	0	4	0	0	4	0	0	10	2	0
How strained	3	1	0	3	1	0	1	3	0	7	5	0
Nitrate	3	1	0	0	4	0	3	0	1	6	5	1
Ice cream	4	0	0	3	1	0	4	0	0	11	1	0
Why choose	3	1	0	3	1	0	3	1	0	9	3	0
Night-rate	4	0	0	1	3	0	3	1	0	8	4	0
An aim	4	0	0	2	2	0	4	0	0	10	2	0
I scream	1	3	0	4	0	0	3	0	1	8	3	1
House trained	2	2	0	1	3	0	2	2	0	5	7	0
White shoes	4	0	0	4	0	0	4	0	0	12	0	0
Total:										86	32	2

The results from the table are: the majority of the 120 answers (= 10 examples x 3 informants x 4 listeners) were correct: 86 = 71,66 % (erroneous answers: 32 = 26,66 %).

In five of ten cases the number of correct identifications was equal to or greater than 9 (= 75 % of the total of 12 answers).

The next table presents the figures indicating the number of correct identifications for each contrastive pair (in descending order) :

Table 2

1. Why choose - white shoes	21
2. A name - an aim	20
3. I scream - ice cream	19
4. Nitrate - night-rate	14
5. How strained - house trained	12

It follows from this table, that the smallest number of correct identifications still reaches 50 % (= 12 of 24 cases) for a contrastive pair, although as could be observed, the internal open juncture has physical manifestations that are poorer and less constant in the English of Romanians than in the English of native speakers.

Pierre Delattre (Comparing the Phonetic Features of English, French, German and Spanish. An Interim Report, Heidelberg, 1965, p.36) sets out the existence of some differences, from the point of view of the juncture, between English and German, on the one hand, and French and Spanish on the other hand. Romanian resembles the last two languages: exactly as in the French du nôtre - d'une autre, the Spanish la esbes - las aves, where "internal juncture is not distinctive (at least at a normal rate of speech)" (Pierre Delattre, quot. place), between the terms of a pair of the type now - c-un as there do not appear, as a rule, distinctive phonetic differences. The features proper to the mother language of our informants (Romanian) explain the difference between the results obtained by Ilse Lehist and those obtained by us.

THE BACK VOWELS OF ROMANIAN AND ENGLISH -
A CONTRASTIVE STUDY

by Laurenția Dascălu

The present contrastive study on back vowels in Romanian and English ends up our research studies in (experimental) acoustic phonetics dealing with the vowels in the two languages, within the Romanian-English Contrastive Analysis Project.¹

We propose to examine experimentally and describe English back vowels as they are pronounced by Romanian speakers who study English.

In English, the series of back vowels includes five phonemes: /ɑ:/ , /ɔ/ , /ɔ:/ , /u/ , /u:/ . As one of them, /ɑ:/ , has already been included in our previous study on central vowels in the two languages, the object of this study will be restricted to the two vowel pairs: /ɔ/ , /ɔ:/ , /u/ , /u:/ .

The distinctive features of these phonemes can be seen in the following table:²

-
- 1 Laurenția Dascălu, The Front Vowels of Romanian and English (A Contrastive Study) in "The Romanian-English Contrastive Analysis Project; Reports and Studies", Bucharest, University Press, vol.1 (1971), p. 113-125; The Central Vowels of Romanian and English. A Contrastive Study. in "Studies" (vol.III, 1972) p.43-67.
 - 2 After Daniel Jones, An Outline of English Phonetics, Ninth Edition, Cambridge, 1967, p.XVII.

Vowel	Vertical Tongue- position	Horizontal Tongue- position	Lip- position	Duration
/ɔ/	open	back	rounded	short
/ɔ:/	half-open	back	rounded	long
/u/	close	back	rounded	short
/u:/	close	back	rounded	long

English has another back vowel, noted /ɔ/ , which Daniel Jones considers half-close³, but this vowel can only be found in diphthongs and it has been studied in the respective chapter.

The series of Romanian back vowels includes twice fewer items, namely:

close: /u/

half-close: /ɔ/

They are opposed in their degree of aperture but not in their duration.

There is no quantitative opposition in the Romanian vowel system, or in the consonant system either.

The fact that Romanian has only two items in the series of back vowels implies a greater liberty in their realization. Their allophones have a larger area of phonetic realization than the allophones of the English back vowels, which are twice as many in number.

This difference between the English and the Romanian vowel system could be reflected in a certain difficulty in the correct acquisition of English vowels by Romanian speakers.

Before verifying this hypothesis through experimental methods, we shall try to compare the back vowels of the two languages from an acoustic and articulatory point of view, making use of the "standard" figures we have at our disposal⁴ and which represent cycles per second (cps.)

³ Ibidem.

⁴ Pierre Delattre, Comparing the Phonetic Features of English, German, Spanish and French, Heidelberg, 1965, p.49, for Ame-

	<u>English</u>		<u>Romanian</u>
/ɔ/	F ₂ - 900 F ₁ - 550		F ₂ - 800 F ₁ - 500
/ɔ:/ ⁵⁾	F ₂ - 800 F ₁ - 400		
/u/ ⁶⁾	F ₂ - 1000 F ₁ - 375		F ₂ - 800 F ₁ - 300
/u:/	F ₂ - 900 F ₁ - 300		

Indicating the value of the formant F₂ on the abscissa and the value of the formant F₁ on the ordinate, we made the diagrams of the Romanian and English vowels and then superimposed them in order to emphasize the difference in location and aperture between the vowels of the two languages, back vowels included. (For the correspondence between acoustic and articulatory features, see further down.) In this diagram, we have represented all the vowels in the two languages, based on the values in the above-mentioned studies by Pierre Delattre and Valeriu Suteu, and for the Romanian vowels /a/ and /ɛ/, the values obtained through synthesis by Andrei Avram.⁷⁾ (see fig.1)

We mention the fact that the position of the first two vocalic formants offers us data on the timbre of the vowel from the point of view of the two pairs of acoustic features: grave vs. acute, compact vs. diffuse, namely: the higher F₁ is, the more compact the vowel is and the lower F₁ is, the more diffuse the vowel

(continuation page 16)

rican English; Valeriu Suteu, Cercetări bazate pe sinteză asupra vocalelor românești, a, e, a, o și u, in BOL XIII (1971) no.1, p.25-39, for Romanian.

- 5 Pierre Delattre uses the notation /o/". Ibidem.
- 6 Pierre Delattre uses also the notation //u//, Ibidem.
- 7 Andrei Avram, Sur la structure acoustique des voyelles neutres du roumain, in "Revue Roumaine", Numero Spécial 4, 1970, p.87-95.

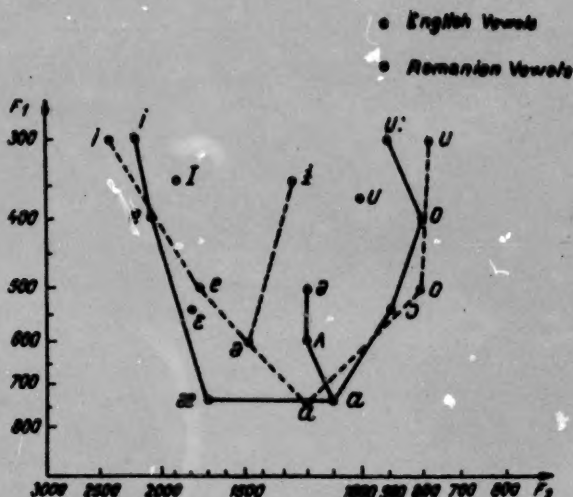


Fig. 1. The acoustic diagram of Romanian and English vowels

is; the higher F_2 is, the more acute the vowel is, and the lower F_2 is, the more grave the vowel is.

The correspondent of the acoustic features grave vs. acute on an articulatory level is the pair of features back vs. front; compact vs. diffuse represent aperture in articulatory terms; namely open vs. close respectively.

Making use of the standard values we shall try to establish the acoustic and articulatory differences between the English back vowels on the one hand, and the English and the Romanian back vowels on the other hand:

English /ɔ/	F_2 - 900 cps.	English /ɔ:/	F_2 - 800 cps.
	F_1 - 550 cps.		F_1 - 400 cps.

Of these two vowels /ɔ/ is more compact (F_1 is higher) than /ɔ:/ and at the same time more acute (F_2 is higher than /ɔ:/). In articulatory terms, /ɔ/ is uttered closer to the front of the oral cavity than /ɔ:/ and is more open than the former. Besides, /ɔ/ is a short vowel, while /ɔ:/ is a long vowel. Comparing these two vowels with the Romanian vowel

/o/ F_2 - 800 cps., we notice that it is as grave
 F_1 - 500 cps.

as the English vowel /ɔ:/ and graver than the English vowel /ɒ/ ;
 With reference to the feature compact vs. diffuse the Romanian
 vowel /o/ finds its place between the two English vowels, coming
 closer to /ɔ/ .

Engl. /u/	F_2 - 1000 cps.	Engl. /u:/	F_2 - 900 cps.
	F_1 - 375 cps.		F_1 - 300 cps.

Of the two vowels, the English vowel /u:/ is the graver
 and more diffuse, which means that it is backer and closer than
 the short vowel /u/ .

When we also take into consideration the Romanian vowel

/u/ F_2 - 800 cps. we notice that this vowel is as diffuse as
 F_1 - 300 cps.

and graver than the English vowel /u:/ . Thus, the Romanian vowel
 is very different from the English vowel /u/ but it differs from
 the English vowel /u:/ only with respect to the feature GRAVE
 vs. acute. In articulatory terms, the Romanian vowel is as close
 as but a little bit backer than the English vowel /u:/ while
 being much closer and backer than the English vowel /u/ .

More over the English vowels /u/ and /u:/ are opposed
 to each other from the point of view of duration and of course
 both also differ quantitatively from the Romanian vowel /u/ .

These remarks corroborate the data contained in the chart
 above (fig.1); indeed, the Romanian vowel /u/ is situated closer
 to the English vowel /u:/ , than to the English vowel /u/ ,
 and the Romanian vowel /o/ is situated closer to the English
 vowel /ɔ/ than to the English vowel /x/ .

The Acoustic Analysis

In order to assess to what extent the Romanian speakers, correctly
 acquired the English back vowels and to what extent they
 were influenced by their own Romanian pronunciation acoustic re-
 search was conducted.

The Word List. In accordance with certain criteria, we drew up a list of English words containing the back vowels /ɔ/, /ɔʏ/, /u/, /u:/ in various positions:

- I. preceding voiced consonants.
- II. preceding voiceless consonants.
- III. in final position (only the long vowels /ɔ:/ and /u:/ occur in this position).
- IV. in minimal pairs (the vocalic context can be the same as in I-III.)

The list contains the following words:

For the vowel [ɔ]

- | | |
|---|---|
| <p>I. dog [dɔg]
cod [kɔd]
rob [rɔb]</p> | <p>IV. dog [dɔg] - dug [dʌg]
stock [stɔk] - stork [stɔ:k]</p> |
| <p>II. got [gɔt]
stock [stɔk]
top [tɔp]</p> | <p>cod [kɔd] - cord [kɔ:d]
rob [rɔb] - rub [rʌb]</p> |

For the vowel [ɔ:]

- | | |
|--|---|
| <p>I. cord [kɔ:d]
caused [kɔ:sd]
George [dʒɔ:dʒ]</p> | <p>II. stork [stɔ:k]
short [ʃɔ:t]
horse [hɔ:s]</p> |
| <p>III. tore [tɔ:]
saw [sɔ:]</p> | <p>IV. cord [kɔ:d] - cod [kɔd]
stork [stɔ:k] - stock [stɔk]</p> |

For vowel [u]

- | | |
|--|--|
| <p>I. sugar [ʃʊgə]
stood [stʊd]
should [ʃʊd]</p> | <p>II. cook [kʊk]
soot [sʊt]
put [pʊt]</p> |
| <p>IV. should [ʃʊd] - shoed [ʃu:d]
put [pʊt] - boot [bu:t]</p> | |

For vowel [u:]

- | | |
|---|--|
| <p>I. shoed [ʃu:d]
shoes [ʃu:s]</p> | <p>II. tooth [tu:θ]
goose [gu:s]
boot [bu:t]</p> |
|---|--|

III. who [hu:]
do [du:]
few [fju:]

IV. boot [bu: t] - put [put]
shoed [/u: d] - should [/u: d]

As already shown, on the basis of both spectrographic⁸ analysis and synthesis⁹ the average values of the Romanian vowels had already been calculated, so that these values can be used for reference purposes in the present study. However we have considered it necessary to determine to what extent the individual pronunciation of each student influenced his English pronunciation. To this aim, we drew up a list of Romanian words containing back vowels.

For the vowel [o:] cod
pod

For the vowel [u:] cuc
sut

The Subjects. The above English and Romanian words were read by 12 subjects in random order into the microphone and tape-recorded. The subjects are speakers of Romanian, men, having studied English for different periods of time.

After carefully listening into the recorded tapes, according to their voice quality and to the closeness of their Romanian pronunciation to literary Romanian we selected only some of them as follows:

"Intermediate"

AC - 20 years old, student of the Faculty of German. He had studied English for 4 years in high school and for two years in college.

ND - 26 years old, student of the Faculty of German. He has studied English for two years in college.

"Advanced"

IS - 19 years old - first year student of the Faculty of English. He had studied English for 7 years in high school.

FF - 19 years old - first year student of the Faculty of English.

⁸ Valeriu Suteu, Observatii asupra structurii acustice a vocalelor romanesti i, e, o si u, in SCL XIV (1963), no. 2, p. 179-198.

⁹ See note 4.

He has studied English for four years in high school and had had lessons of English for five years (out of which two years of 'intensive' teaching). We could not select any subject representing 'beginners' because of their excessively unclear and faulty pronunciation.

Results of the Instrumental Analysis

The selected material was subjected to spectrographic analysis. Sonagrams of both Romanian and English words were obtained by using the wide-band filter of the sonagraph. Sections were made with the narrow-band filter in the steady-state region of back vowels.

The next step was the identification and measuring of the first two formants on these sonagrams. We also tried to delimit the vowel segments with a view to measuring their length.

The resulting values were grouped in tables, specifying the value of the formants F_1 and F_2 in cycles per second (cps.) and the length of vowel items in milliseconds (msec) for each speaker and each vowel separately. These tables also contain the average values for each vowel "position" in the word, as well as the general average values (for speakers) of the formants F_1 and F_2 and of the vowel duration.

The comparison was facilitated by the selection of the average values for each vowel and each speaker and by their inclusion into a final table which also indicates the standard values of English and Romanian vowels on the left and right respectively (see table I). One can easily compare the F_1 and F_2 values of the English vowels pronounced by the 4 Romanian speakers with the standard English vowels. The table also shows to what extent each of the speakers got closer to the correct pronunciation of the target language, as well as the extent to which his Romanian pronunciation exerted an influence.

Table I indicates the average values of the English and Romanian vowels pronounced by the 4 speakers individually; on the left we mention the standard values of the English vowels and on the right the standard values obtained by means of spectrographic analysis and of synthesis for the Romanian vowels. The first

Table I

		English				Romanian						
Vow-el	Stan-dard (De-lat-tre)	"advanced"		"inter-mediate"		FF	IS	AC	ND	Stan-dard (ana-lysis)	Stan-dard (syn-the-sis)	Vow-el
		FF	IS	AC	ND							
	900 550	1054 583	1032 603	966 573	972 540							
	800 400	843 507	885 570	870 444	906 513	900 504	1170 612	936 432	1008 504	1000 400	800 500	o
u	1000 375	1052 424	1044 376	868 399	936 400							
u:	900 300	969 363	930 333	828 326	816 286	756 360	1008 432	738 284	864 360	850 350	800 300	u

figure corresponds to F_2 , the second to F_1 and is rendered in terms of cps.

A thorough examination of the table leads to the following conclusion :

1. A great oscillation of the figures corresponding to F_1 and F_2 among the speakers both for the English and the Romanian vowels.

2. Formant F_1 and F_2 corresponding to the Romanian vowels pronounced by the 4 speakers do not coincide with the standard values obtained by analysis and, so much the less with those resulting from synthesis. The fact is easily accountable for. The figures obtained by synthesis represent those values of "optimum" frequency which recorded the highest percentage of identifications at the auditory tests. The figures obtained by spectrographic analysis represent average values resulting from the examination of the speech of a certain number of Romanians, whose pronunciation evinced a certain degree of closeness to the standard language. The pronunciation of our subjects, however, seems to get closer to the results obtained by analysis.

This conclusion regarding Romanian implies a certain tolerance in the consideration of English standard figures too (also obtained by means of synthesis), as it is assumed that they can be reached as such otherwise only than accidentally by speakers of literary English, thus representing ideal values function as reference indices.

3. As far as the vowels having the timbre (quality) [o] are concerned we can notice that, with all the subjects, F_2 corresponding to the English vowel [o] is higher than the standard value, invariably topping 900 cps. while F_1 has values closer to the standard (about 550 cps.). We consider therefore that this vowel was assimilated correctly enough in point of openness, but was articulated in a more front position than necessary.

The English vowel [o:] was, on the other hand, better assimilated from the point of view of articulatory position, than from that of aperture (F_2 is generally closer to the standard than F_1). This proves that the difficulty encountered by Romanians in the acquisition of these vowels lies in the correct assimilation of the articulatory position for the English vowel [o] and in the degree of openness for the English vowel [o:] .

If we consider the pronunciation of the Romanian vowel [o] by our subjects, we deduce that it influenced both the more front articulation of the English vowel [o] , and the opener pronunciation of the English vowel [o:] .

The influence of the individual pronunciation is also noticeable independently for each of the subjects, by examining the respective columns in table I. Thus, for instance, in the Romanian pronunciation of the speaker IS, both formants of the vowel [o] are higher than the Romanian standards, a tendency which is reflected in his English pronunciation too (higher F_1 and F_2).

As regards the speakers' grouping according to their stage of language acquisition, the two more advanced students of English cannot be said to have a "more correct" pronunciation than the intermediate ones.

We should also point out that, no matter how correct the pronunciation of the two English vowels [o] and [o:] was, there still persists a considerable difference between them within the pronunciation of one and the same speaker. Even if it does not ap-

proach the standard figure too much, the vowel [ɔ] was invariably articulated with values which are higher than those of the English vowel for both formants, and this opposition corresponds to reality (the standard figures for [ɔ] are higher than the standard values for [ɔ:]).

All this demonstrates that the subjects were aware of the difference of timbre between the two English vowels (more than the dissimilarity between them and the Romanian vowel o) and they tried to assimilate this opposition.

4. Analyzing the vowels having the timbre u, we are going to see, first of all that the F_1 and F_2 values of the Romanian vowels get closer to the standard figures, while the English vowels [u] and [u:] were less influenced by the Romanian pronunciation of the Romanian vowel [u].

Secondly, we notice a clear-cut distinction between the two groups of speakers in the assimilation of the two English vowels [u] and [u:]. With the more "advanced" subjects the values are closer to the English standards than with "intermediate" subjects. As F_2 is much lower than the standard figures, the conclusion may be drawn that the vowels uttered by "intermediate" subjects are characterized by an articulation place which is more posterior than that of the English standard vowels, this being the result of the Romanian influence in the pronunciation of the vowel [u].

As far as the "advanced" subjects are concerned, F_2 is closer to the standard figures. As a general remark we must say, that the advanced subjects pronounced the English vowels more open and more anterior than the standard vowels. This way of pronouncing is exaggerated: trying not to be influenced by Romanian, the speakers forced the English pronunciation (surpassing the values of the formants F_1 and F_2 , required by the norm).

In the case of the English vowels of timbre u, we can remark the constant different pronunciation of the English vowel [u] from [u:] a difference that appears in the pronunciation of the same speaker. The values of the formants F_2 and F_1 are higher for [u], this difference being present also in the standard vowels.

As far as the vowels of timbre o are concerned, we consider

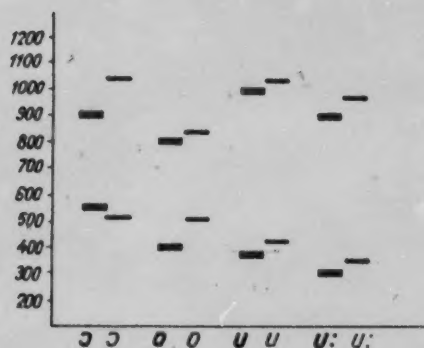
that the Romanian speakers of English managed to produce the vowels [u] and [u:] much better, being less influenced by the Romanian [u] than by the Romanian [o].

Of course, if we compare the values of F_2 and F_1 that are to be found on the left and right side of table number I and which belong to the same speaker, we notice the maintenance of the peculiarities of pronunciation that belong to everyone. For example, subject IS has the same tendency of pronouncing the formant higher both in English and Romanian, and subjects AC and ND have the tendency of pronouncing the formants in both languages lower.

Generally, we cannot assert essential differences between the frequency of these vowels in different positions in the word, but we shall see that there are differences as far as their duration is concerned.

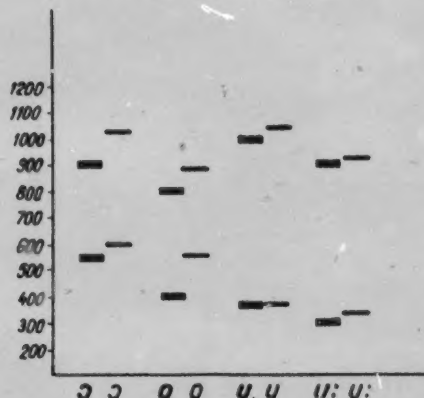
$x^x x$

In order to compare the English vowels as pronounced by Romanians to the English standard vowels, we have arranged formants F_1 and F_2 on a musical scale, first the standard English vowels, then the vowels as uttered by each speaker.



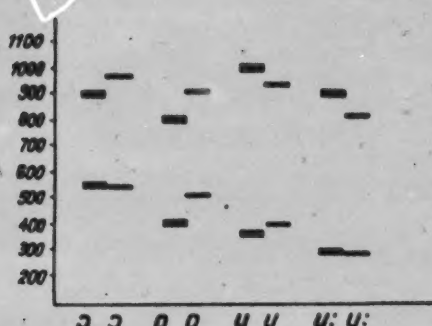
Speaker FF

Fig. 2.

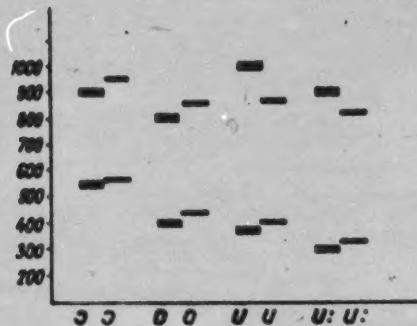


Speaker IS

Fig. 3.



Speaker DN



Speaker AC

Fig.4.

Fig.5.

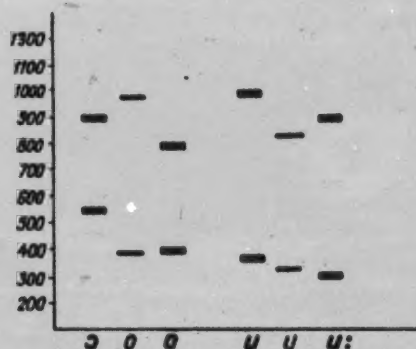


Fig.6.

In chart number 6 we have indicated, in the same way the standard back vowels in both languages.

In charts number 7-10 we constructed the diagram of the standard English vowels, on which we have indicated separately, for each speaker, the position of the back English vowels as pronounced by them.

An attentive look at these charts would suggest how much every subject managed to learn the standard English pronunciation.

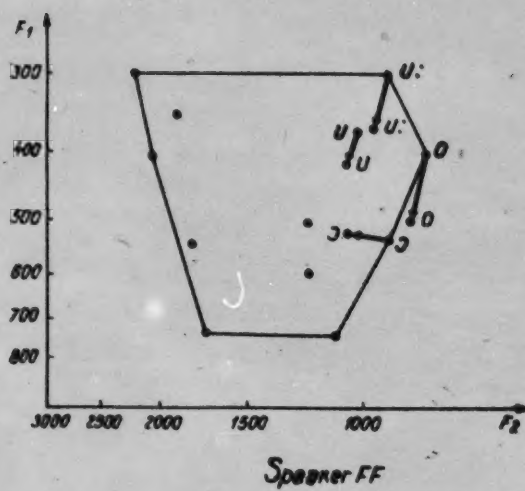


Fig. 7.

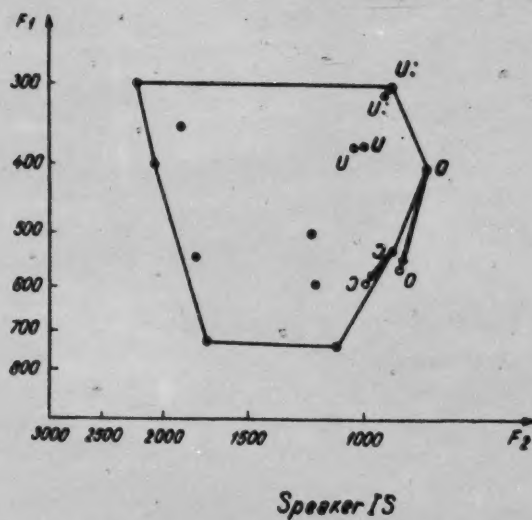
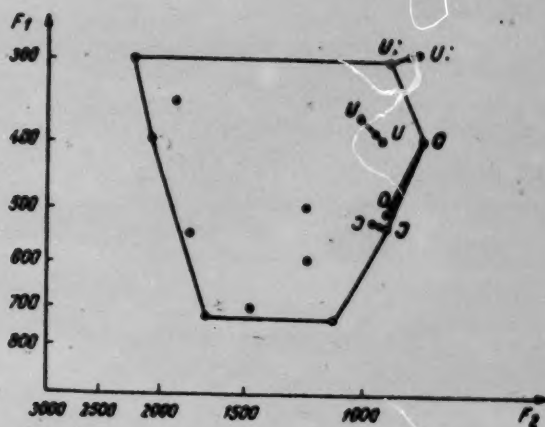
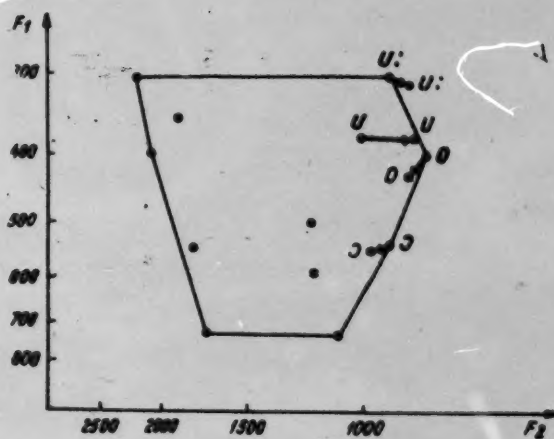


Fig. 8.



Speaker DN

Fig. 9.



Speaker AC

Fig. 10.

Considerations on the vowel duration

It is known that the phonologic system of Romanian does not possess quantitative oppositions. That means that the duration of the Romanian vowels has not a distinctive role. In current speech, the duration appears unconsciously in the flow of speech, conditioned by position within the word, by stress and rhythm, a.s.o.

The English vowels under discussion do not differ only from the point of view of colour but also from the point of view of duration. If the Romanian vowels do not differ much from the point of view of duration, the back English vowels essentially differ from the quantitative point of view (see table II).

Table II

V o w e l	Engl. [ɔ]	Engl. [ɔ:]	Rom. [o]	Engl. [u]	Engl. [u:]	Rom. [u]
Average duration in msec.	160	267	171	133	240	133

From this table we can notice the following:¹⁰

1. The Romanian vowels o and u, without contrasting by the opposition short vs. long, are different from the point of view of duration: the closed vowel u is shorter (133 msec) than the open vowel o (171 msec).

2. The average duration of the Romanian vowels comes closer to the average duration of the short English vowels. That is why Romanian speakers assimilate short English vowels to the "corresponding" Romanian vowels.

3. On the other hand, the speakers were conscientious of the existence of a quantitative opposition among the English vowels and tried hard to make it. As we can notice, the English vowels they produced, contrast from this point of view. If we calculate the relative duration, this opposition becomes even more evident (we consider the duration of the short vowel - 1).

¹⁰ The observations hold good for the material analysed by us.

Table III

Vowel	Absolute duration	Relative duration
[ɔ]	160	1
[ɔ:]	267	1,67
[u]	133	1
[u:]	240	1,73

If we compare the duration of the English vowels as pronounced by our subjects with the given duration of the English vowels,¹¹ we notice that the average figures reached by the subjects come close to the standard figures (see table IV).

In table number IV we notice the way in which each subject managed to approximate the standard duration:

Table IV

Vowel	Standard duration	Average duration of all subjects	"advanced"		"intermediate"	
			PF	IS	ND	AC
[ɔ:]	250	267	280	282	278	227
[u]	163	133	110	121	169	132
[u:]	235	240	198	238	305	220

From the tables drawn for each subject, we notice differences of duration of the vowels in different positions in the word:

- the long vowels [ɔ:] and [u:] have the greatest duration in final position, as compared to other positions (marked I, II, III);
- the shortest duration, for both short and long phonemes, is to be found in words that constitute contrastive pairs, a fact

¹¹ According to Gordon E. Peterson and Ilse Lehiets, Duration of Syllable Nuclei in English, in J.A.S.A., vol. 32 (1960), no. 6, p. 702.

which denotes an exaggerated lengthening of the vowels when these words are produced in isolation.

It is possible that the vocalic duration in contrastive position (marked IV) be closer to reality, that means closer to the duration used in the flow of speech.

REMARKS ON THE ENGLISH DIPHTHONGS AND TRIPHTHONGS
AS PRONOUNCED BY NATIVE SPEAKERS OF ROMANIAN

by Cornelia Coht

1. Introduction

It is a well-known fact that there is great divergence of views on the number and description of English diphthongs and triphthongs (cf. 5, p.249; 6, p.58-60, 98-100; 8, p.235-237; 9; 12, p.86). Consequently the phonetic symbols used to transcribe them differ too.

Thus, while most phoneticians consider the groups [ei] , [ou] diphthongs, Lehište and Peterson (8) classify them as "glides". On the basis of acoustic analysis the above mentioned authors have subdivided the group of "complex long syllable nuclei" into:

- "glides" [e^I] , [o^U] , [ɜ] characterized by "the single-target position", and

- "diphthongs" [aɪ] , [aʊ] , [ɔɪ] characterized by "the double-target positions".

For greater clearness we quote the description of a "glide": "Phonetically, these single-target complex nuclei are difficult to segment into a sequence of two sounds. There is no steady state for the first element of /e^I/, but a slow glide appears toward the target position, the glide being longer than the target. Often the first part of /e^I/ has been called the "full vowel" and the second element the glide or semivowel. In the dialect under study, it is actually the second element that has a steady state and the first element that is phonetically a glide - longer than any other onglide ... The formant movement is continuous, however, in such instances, and no target according to our definition can be located" (8, p.235).

We must also point out the great variety of possible pronunciations (cf. 6, p. 100-125; 7), which partly account for the differences in the descriptions of the same diphthong:

- "The English diphthong ou, as I pronounce it, starts with a tongue-position in advance of and somewhat lower than that of cardinal o, and a lip-position of medium rounding; the speech-organs then move in the direction of u" (6 p. 101-102).

- "(ou). The vowel sound at the beginning of this diphthong is (ə:), and the vowel at the end of it is (u). The learner must start with the lips spread as for (ə:) and then gradually round them. At the same time the mouth is closed slightly" (9, p. 60).

The above-mentioned facts explain the difficulties encountered in an attempt to establish the inventory of diphthongs and triphthongs in English, as well as their phonetic transcription.

As far as the phonetic transcription is concerned it must also be taken into account that none of the vowels occurring as part of a diphthong or triphthong is wholly identical with its corresponding monophthong vowel. "Neither of the elements comprising the diphthong is ordinarily phonetically identifiable with any stressed English monophthong; for example, in /ai/ the first element is neither /a/ or /æ/, and the second element is neither /i/ nor /ɪ/. The symbols /ai/, /au/, and /ɔɪ/ are adopted tentatively as labels for these syllable nuclei" (8, p. 235).

Specialists in the field lay special stress on the fact that the symbol used to transcribe the second element of the diphthong indicates only the direction of movement of the vowel group and not the concrete phonetic realization of the respective sound: "it is not necessary that the limit of the movement should be actually reached. Thus the English diphthong ai is one which begins at a and moves in the direction of i. To give the right effect it is not necessary that i should be quite reached; the diphthong may and generally does end at an opener vowel than this, such as a fairly open variety of a. i merely represents the furthest limit of movement" (6, p. 58-59).

In the present paper we have generally adopted for every separate vowel group the symbols corresponding to the results of our research. We have used the symbols [ou], [ouə], though the first

vowel in these groups is closer to the vowel [ə] in point of structure, because this transcription is more frequently used in the reference material.

2. Material and method

To establish the inventory of English diphthongs and triphthongs and to select the examples we used the book by J.D.O'Connor. The words were selected taking into account the following criteria: we selected words including sounds whose phonetic environment should permit a high degree of correctness in segmentation (cf. 11, p.192); we also found pairs of words where confusions could arise between two diphthongs (triphthongs) or between one diphthong (triphthong) and a vowel similar to it in colour and to which it could be reduced.

Every diphthong (triphthong) occurs in three examples for every position which it may have in English (word final, before voiced consonants, before voiceless consonants) :

- [ɔʊ] : go, so, hoe; stove, shows, soda; steat, coat, oaks;
[aʊ] : how, cow, sow; thousand, cows, loud; houses, rough, stout;
[eɪ] : say, day, hay; age, lays, paid; tang, taken, eaten;
[aɪ] : tie, buy, high; tide, buys, signs; bite, vice, ring;
[ɔɪ] : boy, toy, joy; boys, yoys, void; voice, chains, leather;
[iə] : hear, steer, fear; hears, steered, heard; theatre, sheerful, pierced;
[eə] : hair, stare, fair; hairs, stared, barred; noises, careful;
[ʊə] : pure, tour, sure; cured, poorer, mourid;
[ɔə] : pour, tore, shore;
[aɪə] : sigher, tire, buver; tired, buyers, hired;
[aʊə] : tower, cover, power; coward, towering, doury;
[eɪə] : sever, sever, sever;
[oʊə] : slower, lower, grower; growers, lowered, followers;
[ɔɪə] : employer, destroyer; loyal, employers.

The above examples were arranged in random order in a list including the material necessary also for the acoustic study of the other English sounds pronounced by native speakers of Romanian.

We recorded on magnetic tape both the list of words arranged in random order and a great part of the words arranged in pairs. Thus we were able to investigate whether there are differences in the pronunciation of the same diphthong (triphthong) not only when the words occurred in random order (the subject did not know what sound or phenomenon was being investigated) but also when the difference between two words was emphasized (e.g. go [əu] - go [əu] , code [kəʊd] - curd [kəʊd] , hair [hæ] - hear [hiə] , pour [pəʊ] - poor [pʊə]).

The subjects who were supposed to have a better command of English were requested to pronounce some more examples illustrating the variation in duration of the diphthongs depending on their position in the word:

- [eɪ] : day days date
- [aɪ] : lie line like
- [ɔɪ] : boy boys voice
- [oʊ] : go goes goat
- [aʊ] : how howl house
- [iə] : fear feared fierce
- [ɪə] : scare scared scarce
- [ʊə] : moor moors

The material was recorded in a sound-treated room and the tape recorder was placed in an adjoining control room.

Before reading the whole material before the microphone the subjects had carefully gone through the list of words. They were requested not to read the unknown words.

The subjects were subdivided into three groups according to their degree of competence in English:

- beginners (SM, DM) - having studied English no longer than 6 months (intensive courses);
- intermediate (RA, VC, CN, ND, FR, CA, AA) - students of the Pe-

culty of Physics and Mathematics attending English classes optionally (some of them having studied English in high-school as well);

- advanced (FF, OR, SI) - students in the English Department of the Faculty of Germanic Languages.

It was considered interesting to notice the differences in pronunciation as well as the confusions arising separately in the three groups of subjects. Subsequently we had to give up both the acoustic and the auditory analysis of the material obtained from the beginners because many words were unknown to them (some examples were not read at all while others were read incorrectly).

Four subjects were selected for the acoustic analysis: RA, VO (intermediate) and OR, SI (advanced). Our selection was based on the clarity of their voices and on the absence of dialectal features in pronunciation.

The words in the randomized list were recorded on the sonograph. Broad-band spectrograms were obtained and narrow-band sections were made for each vocalic element of the diphthong (triphthong) in the steady-state. Mention should be made of the fact that mainly in the case of triphthongs it was not possible to obtain sections for every vowel. It is also important to note that the number of measured cases differs somewhat from one subject to another, as not every example was read correctly.

We do not have data on the duration and frequency of the constituent elements for all the diphthongs and triphthongs of the English language. To obtain comparable values we obtained spectrograms of the standard pronunciation of the diphthongs and triphthongs in British English and spectrograms of the similar Romanian diphthongs as pronounced by the same subjects (RA, VO, OR, SI). To obtain the standard British English pronunciation we copied on magnetic tape the records produced for J.D.O'Connor's book. As these records give a model pronunciation we recorded on sonograph only a small number of examples for every diphthong (triphthong):

[ɔv] : go, stove, stout;

[ɔw] : how, cows, stout;

- [eɪ] : hay, days, tape;
- [aɪ] : high, buys, bite;
- [ɔɪ] : toy, boys, choice;
- [iə] : steer, hears, theatre;
- [ɛə] : stare, hairs, scarce;
- [ʊə] : pure, tour, sure, cured;
- [ɔə] : pour, tore, shore;
- [aɪə] : hire, tire, tired;
- [aʊə] : power, tower, coward;
- [eɪə] : player, grayer, layer;
- [oʊə] : slower, lower, growers;
- [ɔɪə] : employer, destroyer, loyal.

For the analysis of the Romanian diphthongs the following examples have been recorded: dai, taică, suveică, scinteia, boi, doi, bou, ecou, sau, dau, tău, popindău.

We shall compare the results obtained in our analysis with the frequency values of the vowels of English and Romanian. We shall make references to studies based on spectrographic analysis. For English vowels and diphthongs we shall refer to the studies written by Petersen and Barney (10), Lehieste and Petersen (8), Holbrook and Fairbanks (5), and for the Romanian vowels we shall refer to the studies written by A. Avram (1) and V. Guteu (13).

We would like to point out the fact that these references are relative because on the one hand the studies we shall refer to include analyses based on more varied techniques, on a larger number of examples recording the pronunciation of a greater number of speakers; on the other hand the data referring to the same sound differ in the above-mentioned studies (cf. the results presented in 4, p.49; 10, p.126; 5, p.254; 8, p.229; 2, p.117; 3, p.54, 55, 62; 14).

The following abbreviations will be used in presenting the results of our research: Am.E - American English; Brit.E - British English, Rom.E - the English of Romanians.

3. Duration of English diphthongs and triphthongs

For duration measurement, segmentation has been based on the acoustic cues indicated by Peterson and Lehiste (11), but unlike the above-mentioned authors we have included aspiration after the initial plosive in the duration of the consonant.

It is well known that formant duration varies (5, p.252-253). There are numerous cases in which the onset of the first formant precedes the onset of the other formants, and the duration of FIII is much shorter in the case of certain vowels than that of FI and FII. The present paper is not concerned with the differences in duration between diphthong and triphthong formants, and that is why we have determined duration in relation to the onset and to the cessation of FI.

Before we present our remarks based on our measurements, we must emphasize the fact that our results are relative in character: the words which have been read by our subjects belong to a list and not to a text in which duration would have been more similar to actual duration in speech.

As a first stage we undertook to find the variations in English diphthong and triphthong duration as pronounced by Romanian native speakers, in relation to their position in the word. "In general, the syllable nucleus is shorter when followed by a voiceless consonant, and longer when followed by a voiced consonant" (11, p.200).

Table 1 gives, for each separate speaker, the average duration for all the diphthongs in relation to their position in the word. We see that in spite of the nature of a diphthong, for each position in the word (final, before a voiced consonant, before a voiceless one) and for each separate speaker, duration varies within relatively narrow limits, a fact which has made it possible for us to obtain a general average duration of the diphthongs in relation to their position in the word. These average durations show that in general a diphthong is longer in word final position and is shorter when it is followed by a voiceless consonant.

Diphthong duration in English (in msec.)

Position	Speaker	[eu]		[əv]		[et]		[ai]		[ɔi]	
		Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion
Final	RA	3	385	2	420	3	382	3	407	3	392
	VC	2	390	2	330	3	355	3	367	3	397
	OR	3	412	3	453	3	405	3	412	3	432
	SI	3	377	3	327	3	365	3	365	3	355
	Brit. E	1	472	1	540	1	517	1	540	1	570
Before a voiced con- so- nant	RA	2	360	3	328	1	345	3	354	3	382
	VC	3	305	2	300	2	330	3	322	3	295
	OR	2	355	3	312	3	370	3	365	3	392
	SI	3	285	3	240	2	258	3	315	3	315
	Brit. E	1	495	1	487	1	510	1	592	1	495
Before a voice- less con- so- nant	RA	3	333	2	367	3	267	3	377	3	322
	VC	3	290	3	277	3	260	3	277	3	267
	OR	3	317	2	330	3	242	3	327	3	290
	SI	3	247	3	296	3	255	3	247	3	247
	Brit. E	1	210	1	210	1	210	1	210	1	225

Table 1

in relation to position in the word

[iə]		[tə]		[ʊə]		[uə]		Limits within which it varies	Average
Number of cases	Duration	Number of cases	Duration	Number of cases	Duration	Number of cases	Duration		
3	442	2	427	2	487	1	472	382-495	<u>420</u>
3	367	3	390	1	442	2	337	330-442	<u>375</u>
3	422	3	447	2	405	3	397	397-453	<u>420</u>
3	387	3	417	-	-	3	360	327-417	<u>370</u>
1	592	1	600	3	522	2	505	472-600	<u>530</u>
2	318	3	405			1	165	318-405	<u>360</u>
1	375	2	352			1	247	295-375	<u>325</u>
3	352	2	382			1	180	312-392	<u>360</u>
3	330	3	347			2	252	240-347	<u>270</u>
1	430	1	487			1	270	435-592	<u>500</u>
2	236	-	-					236-371	<u>320</u>
2	198	-	-					260-290	<u>255</u>
3	255	1	360					242-360	<u>305</u>
3	150	2	322					247-322	<u>270</u>
1	150	1	292					150-292	<u>215</u>

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Position in the word	RA	VC	OR	SI	Brit. E
Final	420	375	420	370	530
Before a voiced consonant	360	325	360	270	500
Before a voiceless consonant	320	255	305	270	215

The difference in duration in relation to the degree of sonority of the following consonant is not very obvious and seems to be more consistent only in the speech of OR (advanced).

In Brit. E. all the diphthongs are much shorter before a voiceless consonant than before a voiced one. The difference is very great, exceeding the general ratio of 2:3 mentioned in phonetic studies (see 11, p.200). This difference can be accounted for by the fact that the recorded model pronunciation is rather "recherché", especially meant to emphasize this very difference in duration.

Table 2

Average duration of the English diphthongs
[eɪ] , [oʊ] , [aʊ] , [aɪ] , [ɔɪ] (in msec.)

Speaker/ Language	[eɪ]	[oʊ]	[aʊ]	[aɪ]	[ɔɪ]
	Num- Du- ber rat- of ion cases	Num- Du- ber rat- of ion cases	Num- Du- ber rat- of ion cases	Num- Du- ber rat- of ion cases	Num- Du- ber rat- of ion cases
Average for five speakers	270	220	300	350	370
Am. E in mini- mal pairs (one speaker)	243	220	302	303	360

Table 2 (continuation)

Speaker, Language	[eɪ]		[oʊ]		[aʊ]		[aɪ]		[ɔɪ]	
	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion	Num- ber of cases	Du- rat- ion
Average for all recurren- ces (one speaker)		200		222		302		310		360
RA	7	306	8	346	7	347	9	365	9	352
VC	8	295	8	297	7	288	9	299	9	281
OR	9	306	8	336	8	321	9	346	9	341
SI	8	256	9	266	9	268	9	281	9	281
Brit. E	3	360	3	352	3	348	3	401	3	360

Average duration for a number of diphthongs has been obtained (average duration which results from the duration of the diphthongs preceding a voiced consonant and that of diphthongs preceding a voiceless one) for each separate subject, with a view to comparing them with the average durations of the corresponding diphthongs in Am.E. The average duration for Am.E has been obtained by measuring duration in minimal pairs which differ in relation to the sonority of their final consonant (11, p.199-200). In Table 2 one can see that while in Am.E there are marked differences in duration based in the nature of the diphthongs, in Rom.E diphthong duration is more or less the same in the speech of every subject, being, therefore, of an idiosyncratic nature:

The shorter duration of the diphthongs [eɪ], [oʊ] as compared to that of other diphthongs, is also mentioned in studies by other authors. "The formant durations of /eɪ/ and /oʊ/ are seen to be somewhat shorter than the corresponding ones of /aɪ/ and /aʊ/. The short durations of /eɪ/ and /oʊ/ correspond to the general conception that they involve less articulatory movement than /aɪ/ and /aʊ/" (5, p.253).

Examining the figures in Table 1 we can see that the diphthongs [ɪə] (in final position and when preceded by a voiced consonant), [eə] , [ɔə] and [ʊə] (in final position) (there are no similar diphthongs in Romanian) are relatively longer, as they imply a greater articulatory effort on the part of the speaker. The tendency, in such cases, is to pronounce a group of sounds, instead of a diphthong.

The figures in Table 1 also draw our attention to the fact that there are, for the diphthongs [eə] (before a voiceless consonant) and [ʊə] (before a voiced consonant) shorter durations than those for other diphthongs or for the same diphthongs but in other positions. These durations are not included in the average estimation and they were not taken into account when we established the limits within which diphthong duration varies in relation to position in the word. The reason why we have left them out is that we obtained the above mentioned figures for diphthongs occurring in longer words (in general dissyllabic words) while most of the examples in which diphthongs occur are monosyllabic words. Duration varies therefore, also in relation to word length.

The results of the measurement of the Romanian diphthongs appear in Table 3. One can see that variation in duration does not

Table 3

Diphthong duration in Romanian (in msec.)

Speaker	Number of cases	[ɛu]	[ou]	[au]	[eɪ]	[aɪ]	[oɪ]	Limits within which it varies	Average
RA	2	333	330	420	232	352	374	232-374	<u>340</u>
VC	2	330	243	345	191	232	300	191-345	<u>275</u>
OR	2	425	401	453	282	333	449	282-453	<u>390</u>
SI	2	295	252	314	168	219	283	168-283	<u>255</u>

depend on the nature of the diphthong; as has already been mentioned it is again idiosyncratic (longer durations for speakers RA, OR, and shorter for speakers SI, VC). In the case of the diphthongs [eɪ]

Table 4

Duration of English triphthongs (in msec.) in relation to their position in the word

Position	Speaker	[aɪə]	[aʊə]	[eɪə]	[oʊə]	[ɜɪə]	Limits within which it varies	Average
		Num-Du-ber rat-of ion cas-es	Num-Du-ber rat-of ion cas-es	Num-Du-ber rat-of ion cas-es	Num-Du-ber rat-of ion cas-es	Num-Du-ber rat-of ion cas-es		
Final	RA	3 530	3 537	3 477	3 540	2 446	446-540	<u>505</u>
	VG	3 470	2 470	3 462	2 498	2 325	325-498	<u>445</u>
	OR	3 550	3 510	3 480	2 482	2 404	404-550	<u>485</u>
	SI	3 467	3 432	3 440	3 382	2 401	382-467	<u>425</u>
	Brit. E	2 554	2 495	3 536	2 491	2 493	491-554	<u>515</u>
Before a voiced consonant	RA	3 454	3 345		3 427	2 427	345-454	<u>415</u>
	VC	3 400	- -		- -	2 378	378-400	<u>390</u>
	OR	3 489	2 438		2 377	1 427	377-489	<u>430</u>
	SI	3 372	3 310		2 362	2 390	310-390	<u>360</u>
	Brit. E	1 390	1 360		1 345	1 327	327-390	<u>355</u>

and [aɪ] we obtained shorter durations than for the other diphthongs, as a result of the length of the corresponding words.

The same goes for triphthongs. The results we obtained by measuring triphthong duration in English (Table 4) show us that, as in the case of diphthongs:

- there are no differences in duration depending in the nature of the triphthongs;

- triphthongs are longer in word final position than before a voiced consonant;
- triphthong duration varies from one speaker to the other; it is longer in the speech of RA, OR, and shorter in the speech of SI, VC;
- triphthong duration is influenced by the length of the word (see triphthong [aue] , [oue] , [ɔɪə] , before a voiced consonant).

4. Formant frequency of diphthongs and triphthongs in English

In Tables 5-18 we give the results of the formant frequency measurements for the vowels of the English diphthongs and triphthongs in Rom.E (as pronounced by speakers RA, VC, OR, SI) and in Brit.E (5 cps. have been added to the average figures) in contrast with:

- diphthong frequencies in Am.E (we quote figures mentioned by Holbrook and Fairbanks, p.254, and Lehiste and Peterson, p.229 respectively);
- the formant frequencies of the similar vowels in Am.E (mentioned by Peterson and Barney, p.126, and by Lehiste and Peterson, p.229);
- the formant frequencies of the similar diphthongs (recordings of the speech of RA, VC, OR, SI) or similar vowels in Romanian (date mentioned by A.Avram, p.168, and V.Suteu, p.194).

On the basis of the data one can see that the movement of the formants is in general the same in the case of the English diphthongs (triphthongs) as pronounced by Romanian speakers, and by a native (British) English speaker, also in the case of the diphthongs in American English and in that of the similar diphthongs in Romanian. As far as the formants are concerned, there are not differences great enough to warrant the conclusion that the diphthongs mentioned in § 1 (of 4) are more similar to those in Am.E or more similar to Romanian diphthongs. When drawing conclusions one should be more cautious than when one compares diphthong and triphthong formant frequencies with those of the similar vowels in the two languages, as it is obvious that a vowel which belongs to a diphthong (triphthong) cannot be identical with a vowel monophthong.

The comparison of the formant movement of English diphthongs (triphthongs) in Rom.E and in Brit.E with those of the Romanian diphthongs based of spectrograms seems to us to be more conclusive. In order to emphasise this fact we have superimposed the curves which represent the formant movement of all specimens corresponding to a diphthong (triphthong) and we have thus obtained an average curve (see figure 1-14). The figures give the average curves in Rom.E for each separate speaker, two curves for Brit.E which also illustrate duration variation in relation to the voicing of the following consonant, and only one average curve for the Romanian diphthongs based in the speech of the four subjects. In general, one can see that the curves which show the variation in time of the formants of the diphthongs in Rom.E are nearer to those of the similar Romanian diphthongs than to those in Brit.E.

Based on the analysis of the data given in the tables and of the average curves for frequency variation we are entitled to make a number of remarks.

The final vowel in [ou] and [au] and that in [ei] , [ai] , [ɔi] are more diffuse (close) in Rom.E than in Brit.E and in Am.E : both the vowels have a lower F1, while for [i] the upper formants are also higher, and very close to the Romanian vowel [i]. This fact has led us to the conclusion that while in Brit.E and Am.E the final vowel is only indicative of the glide of the diphthong, final vowels with Romanian speakers are realized as such.

The diphthong [ou] is close to the Romanian diphthong [au] both in Rom.E and in Brit.E. The data for Am.E show that the first vowel of the diphthong is [o] (see Table 5 and Fig.1.1 - 1.4).

The average curves of the formant movement show that there is a marked difference in the duration of the various stages of the diphthongs and triphthongs in Rom.E as compared to the duration of the respective stages in Brit.E.

The curves of the diphthongs recorded for Brit.E show very clear targets for both vowels, while the glide has a long duration, the formant movement taking a very slow glide. In the material recorded for Rom.E the target of the first vowel is relatively long as against the duration of the whole diphthong, the glide

is more sudden and shorter, while the target of the second vowel is very short, almost identical with the offglide. (In the case of average curves the movement of the formants in onglide and offglide position is generally annulled.)

The vowels [I] and [U] are hardly outlined in the curves of the triphthongs in Brit.E, while initial and final vowels have long easily delimited targets. In Rom.E [i] and [u] are represented by a characteristic segment while final vowels are very short, with the target hard to delimit, just as it happens in the case of final vowels in diphthongs.

As for the value and movement of the formants of English diphthongs and triphthongs there is no noticeable difference between the material recorded with intermediate speakers and the one with advanced speakers.

5. Listening Tests

We considered it important to complete the remarks concerning the acoustic features of diphthongs (triphthongs) in Rom.E with remarks based on audition impressions. Tests were taken to this end in which the listeners were asked to give the phonetic transcription as exactly as possible.

The whole material (the list of words recorded by the ten subjects) was listened to by one of the observers three times at an interval of several months. The material recorded by subjects RA, VC, OR, SI, on which the spectrograms are based, was given to a group of four observers from the Center for Phonetics and Dialectology, who are adequately trained phoneticians and experts in phonetic transcription.

The audition started by giving the standard pronunciation in Brit.E. The listeners noticed that for Rom.E it is, in most cases, better to use Romanian phonetic symbols, as sounds were perceived to be closer to or identical with the Romanian vowels and diphthongs. For example [o] and [ɔ] were chosen where [ɔ] and [e] should have been pronounced. Discussions were held with the listeners in connection with some notations and remarks.

The results of the tests are briefly given below with the mention that the notation and the remarks of the five listeners generally coincided:

a. Where there is a close diphthong in Romanian, the subjects in most cases pronounced the Romanian diphthongs. The observers unanimously transcribed : [ai] , [ei] , [au] .
[oi] was produced in most cases, but in the case of a few words the advanced subjects and some intermediate subjects who speak Hungarian and German produced the initial vowel [o] or an intermediary sound between [o] and [o] .
The most frequent notation for the diphthong [ov] was [Au] , while in the remaining cases the initial vowel was [e] or [o] (only in the case of the advanced subjects).

b. The English diphthongs for which there are no corresponding Romanian diphthongs evidently raise many difficulties for Romanian speakers. They were very frequently pronounced incorrectly, reduced to a single vowel or pronounced as if there were two syllables.

The diphthong [ɔə] was in most cases pronounced [o:] or [ɔ:] there are no samples with these diphthongs with four of the subjects.

The diphthong [ɪə] was in many cases pronounced [ɪ] or [ɔ:] or as if there were two syllables.

[ɛə] was frequently reduced to [e] , sometimes it was slightly open or pronounced as if there were two syllables.

Closer to the English standard was the pronunciation of two of the advanced subjects and of the intermediate subjects mentioned above.

c. Some of the most frequently confused diphthongs, partly due to the fact that the words were not known, are the following:

[ov]	instead of [av]	<u>in stout</u>
[ɪə]	instead of [ɛə]	<u>in hair, fair</u>
[ɛə]	instead of [ɪə]	<u>in hear</u>
[a:]	instead of [av]	<u>in pouch</u>
[və]	instead of [ɔə]	<u>in pour</u>
[av] or [ov]	instead of [və]	<u>in tour, gourd.</u>

d. No difference in the duration of diphthongs was noticed depending on the voicing of the following consonant. The advanced subjects read a supplementary list in which special

attention was paid to the difference in duration depending on position (see p.36). Although the words were arranged so as to make our aim plain, all the observers noticed that during the audition the length of the diphthongs was approximately the same with two subjects, that there was a slight difference with the third - the diphthongs being longer in final position or before a voiced consonant.

- e. As regards triphthongs there was almost no case of one being pronounced as if it had been perceived to be closer to the British standard.

Apart from the difference in timbre of the target vowels in initial and final position, manifest in the case of diphthongs too, there were differences in pronunciation from Brit.E in the case of the vowels [ɪ] and [ʊ]. In this respect we quote J.D.O'Connor (9): "(aia). This combination is often very badly pronounced. We have already seen that the second part of the diphthong (ai) is (i) and in the word fly this (i) can be heard quite clearly, but in listening to the word fire it will be noticed that the (i) is not at all clear: it is hardly there at all, and it sounds wrong if it is clearly pronounced. Indeed many English people do not pronounce (i) in this combination at all".

Romanian speakers clearly pronounce [ɪ] and [ʊ] (see Fig.10-14), the tendency being to pronounce two syllables.

- f. There were no important differences, save for some accidental ones, between the reading of the words on the randomized list, on the one hand, and the reading of the list of pair-words, on the other hand.
- g. No cases of possible confusion, of the type mentioned by J.D. O'Connor, were discovered, save for some accidental ones, when the words were unknown.

x^xx

On the basis of our analysis regarding acoustic aspects and audition we conclude that the differences in the pronunciation of Romanian speakers compared with the pronunciation in Brit.E and Am.E result from:

- a. The different colour of initial and final target vowels (cf. 4, p.67).
- b. The difference in length of the segments of the vowels group, in the target and glide position.
- c. The failure to observe the difference in duration depending on the voicing of the following consonant.

Table 5

The formant frequencies (in cps.) of the vowels of the English diphthong [ou] and those of the vowels of the Romanian diphthongs [ɔu] and [eu]

Speaker/ language	Number of cases	F					
		I		II		III	
RA	8	550	410	1440	870	2595	-
VC	8	570	360	1550	915	2520	-
OR	8	515	380	1580	545	2450	-
SI	9	560	320	1540	860	2560	-
Brit. E	3	580	430	1370	935	2450	-
Am. E		565	465	882	708	2305	-
Rom. [ɔu]	8	540	360	1620	750	2590	-
Rom. [eu]	8	500	325	1020	750	2480	-

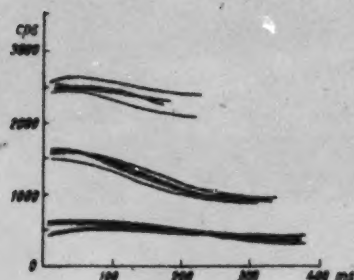


Fig.1.1.1. The diphthong [ou] in Rom.E
(pronounced by RA, VO, OR, BI)

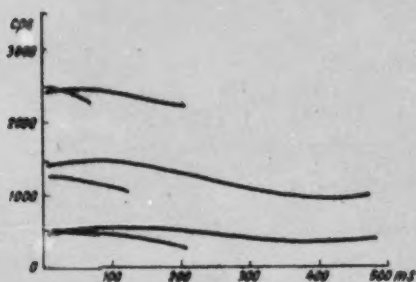


Fig.1.1.2. The diphthong [ou] in Brit.E

Fig.1-14. The average curves illustrating the variations in time of the formant frequencies of diphthongs and triphthongs

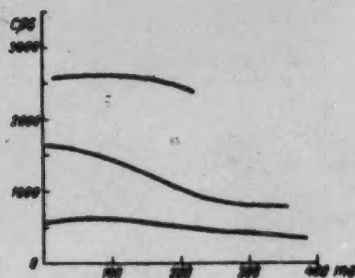


Fig.1.3. The Romanian diphthong [au]
(pronounced by RA, VO, OR, SI)

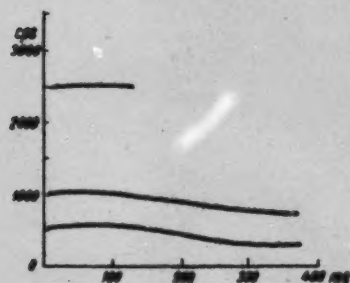


Fig.1.4. The Romanian diphthong [eu]
(pronounced by RA, VO, OR, SI)

Table 6

The formant frequencies (in cps.) of the vowels of the English diphthong [au] and those of the Romanian diphthong [au]

Speaker/ language	Number of cases	F					
		I		II		III	
RA	7	840	430	1290	820	2450	-
VC	7	820	420	1300	890	2430	-
OR	8	850	465	1330	930	2415	-
SI	9	810	360	1270	970	2500	-
Brit. E	3	865	540	1475	970	2265	-
Am. E		770	610	1400	888	2695	2240
		655	510	1255	910	2520	2415
		655	415	1235	870	2215	2225
Rom. [au]	8	790	430	1295	825	2520	-

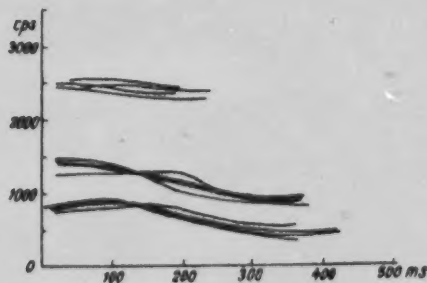


Fig.2.1. The diphthong [au] in Rom.E (pronounced by RA, VC, OR, SI)

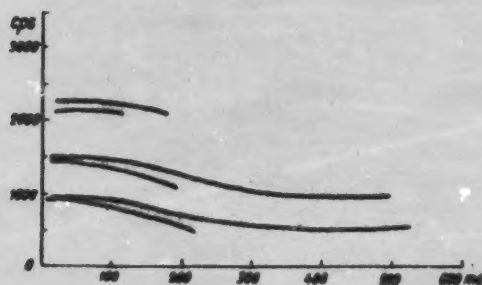


Fig.2.2. The diphthong [au] in Brit.E

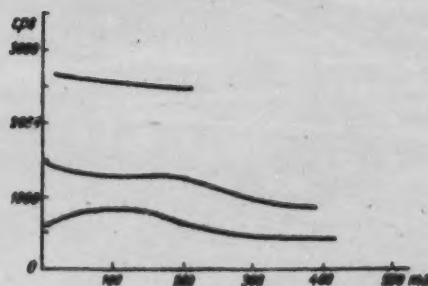


Fig.2.3. The Romanian diphthong [au]
(pronounced by RA, VC, OR, SI)

Table 7

The formant frequencies (in cps.) of the vowels of the English diphthong [ei] and those of the Romanian diphthong [ei]

Speaker/ language	Number of cases	F					
		I		II		III	
RA	7	520	330	2190	2475	2705	3040
VC	8	470	320	1990	2480	2610	3025
OR	9	510	390	2060	2350	2650	2850
SI	8	490	360	2015	2450	2630	2950
Brit. E	3	615	390	1950	2305	2700	2810
Am. E		550	400	2032	2228	2650	2710
Rom. [ei]	8	500	390	2090	2450	2665	3060

Table 8

The formant frequencies (in cps.) of the vowels of the English diphthong [ai] and those of the Romanian diphthong [ai]

Speaker/ language	Number of cases	F					
		I		II		III	
RA	9	820	390	1300	2235	2330	3010
VC	9	875	415	1345	2430	2350	2970
OR	9	865	465	1260	1980	2400	2850
SI	9	750	410	1350	2170	2450	2720
Brit. E	3	865	500	1440	2015	2380	2700
Am. E		750	572	1280	1942	2730	2668
		665	485	1200	1790	2540	2450
		700	375	1315	1975	2360	2585
Rom. [ai]	8	790	430	1370	2450	2415	3095

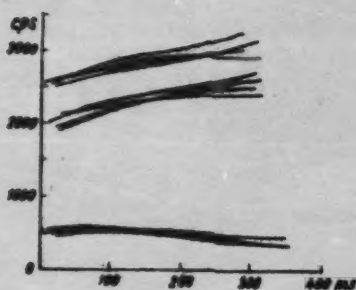


Fig.3.1. The diphthong [ei] in Rom. N
(pronounced by RA, VC, OR, SI)

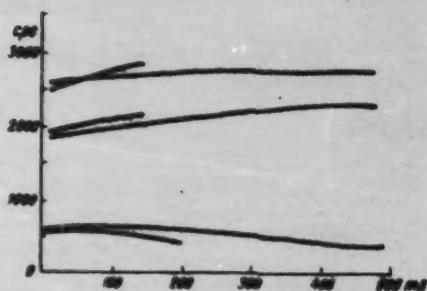


Fig.3.2. The diphthong [ei] in Brit. N

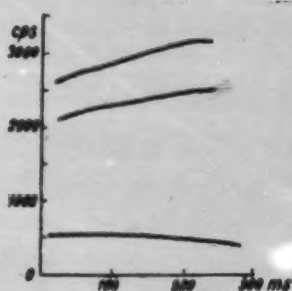


Fig.3.3. The Romanian diphthong [ei]
(pronounced by RA, VC, OR, SI)

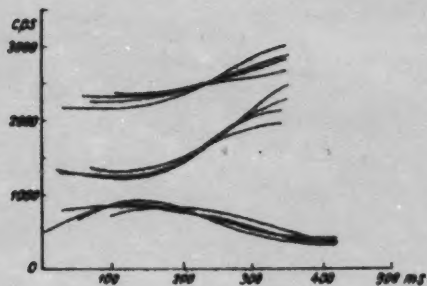


Fig.4.1. The diphthong [ai] in Rom.E
(pronounced by RA, VC, OR, SI)

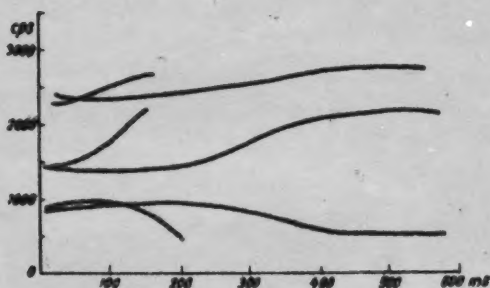


Fig.4.2. The diphthong [ai] in Brit.E

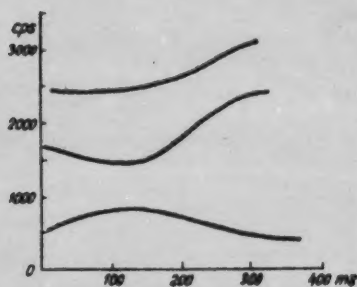


Fig.4.3. The Romanian diphthong [ai]
(pronounced by RA, VC, OR, SI)

Table 9

The formant frequencies (in cps.) of the vowels of the English diphthong [ɔɪ] and those of the Romanian diphthong [oi]

Speaker/ language	Number of cases	F					
		I		II		III	
RA	9	520	350	1010	2240	2550	2890
VC	9	580	360	1075	2180	2370	2740
OR	9	580	450	900	2170	-	2810
SI	9	540	330	1050	2140	2440	2700
Brit. E	3	650	390	970	1875	2450	2650
Am. E		552	512	835	1908	2525	2492
		510	505	900	1610	2510	2425
		550	370	950	1830	2255	2485
Rom. [oi]	3	560	360	1080	2380	2485	2990

Table 10

The formant frequencies (in cps.) of the vowels of the English diphthong [ɪə] compared with those of the English vowels [ɪ] and [ə] and of the Romanian vowels [i] and [a]

Speaker/ language		Number of cases	Sound	F			Sound	F		
				I	II	III		I	II	III
Diph- thongs	RA	7	[ɪ]	360	2315	3025	[ə]	570	1510	2490
	VC	6		340	2345	3010		590	1470	2530
	OR	9		400	2220	2860		530	1670	2350
	SI	9		370	2195	2715		540	1625	2550
	Brit. E	3		540	2015	2700		540	1510	2625
Vowels	Am. E			390	1990	2550				
				415	1750	2470		610	1185	2565
				410	1755	2415		585	1155	2255
	Rom.		[i]	317	2225	2940	[a]	496	1479	2746

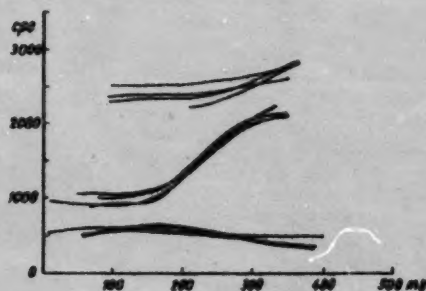


Fig.5.1. The diphthong [ɔɪ] in Rom.E
(pronounced by RA, VC, OR, SI)



Fig.5.2. The diphthong [ɔɪ] in Brit.E

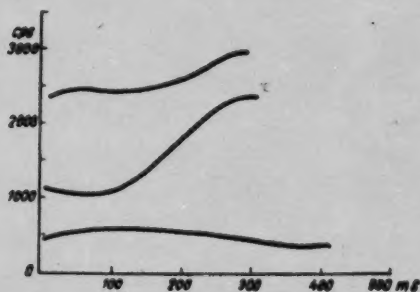


Fig.5.3. The Romanian diphthong [ɔɪ]
(pronounced by RA, VC, OR, SI)

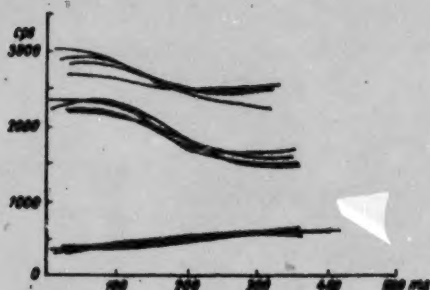


Fig.6.1. The diphthong [ɪə] in Rom. English
(pronounced by RA, VC, OR, SI)

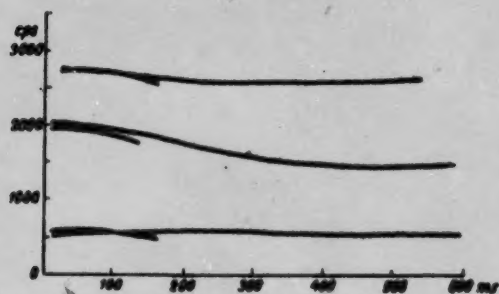


Fig.6.2. The diphthong [ɪə] in Brit. English



Fig.7.1. The diphthong [ɛə] in Rom. English
(pronounced by RA, VC, OR, SI)

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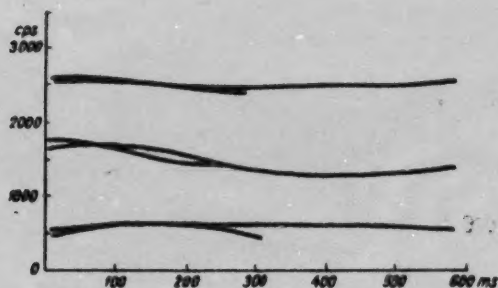


Fig.7.2. The diphthong [ɛə] in Brit.E

Table 11

The formant frequencies (in cps.) of the vowels of the English diphthong [ɛə] compared with those of the English vowels [ɛ] and [ə] and of the Romanian vowels [e] and [a]

	Speaker/ language	Number of cases	Sound	F			Sound	F		
				I	II	III		I	II	III
Diph- thongs	RA	5	[ɛ]	570	1940	2665	[ə]	570	1515	2460
	VC	5		510	1890	2590		590	1385	2280
	OR	6		585	2025	2730		580	1530	2305
	SI	8		490	1935	2650		625	1520	2450
	Brit.E	3		615	1730	2595		615	1370	2520
Vowels	Am.E			530	1840	2480				
				570	1610	2465		610	1185	2565
				540	1705	2415		585	1155	2255
	Rom.		[e]	398	1934	2754	[a]	496	1479	2746

Table 12

The formant frequencies (in cps.) of the vowels of the English diphthong [ʊə] compared with those of the English vowels [ʊ] and [ə] and of the Romanian vowels [u] and [ă]

Speaker/ language		Number of cases	Sound	F			Sound	F		
				I	II	III		I	II	III
Diph- thongs	Rom. E	14	[ʊ]	445	915	2305	[ə]	540	1410	2450
	Brit. E	4		500	1080	2380		580	1405	2595
Vowels	Am. E			440	1020	2240				
				450	980	2360		610	1185	2565
				400	1015	2090		585	1155	2255
	Rom.		[u]	339	850	2507	[ă]	496	1479	2746

Table 13

The formant frequencies (in cps.) of the vowels of the English diphthong [ɔə] compared with those of the English vowels [ɔ] and [ə] and of the Romanian vowels [o] and [ă]

Speaker/ language		Number of cases	Sound	F			Sound	F		
				I	II	III		I	II	III
Diph- thongs	Rom. E	5	[ɔ]	490	935	-	[ə]	500	1400	-
	Brit. E	3		615	935	2415		580	1330	2595
Vowels	Am. E			570	840	2410				
				505	880	2525		610	1185	2565
				590	985	2365		585	1155	2255
	Rom.		[o]	413	984	2597	[ä]	496	1479	2746

Table 14

The formant frequencies (in cps.) of the vowels of the English triphthong [aɪə] compared with the English vowels [a], [ɪ], and [ə], and the Romanian vowels [a], [ɪ], and [ə]

Speaker/ language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Triphthongs	RA	6	[a]	790	1265	2160	[ɪ]	460	1875	2580	[ə]	580	1535	2490
	VC	6		730	1375	2315		480	1940	2580		565	1540	2410
	OR	6		805	1430	2310		500	2010	2780		610	1570	2515
	SI	6		845	1475	2425		525	1985	2675		615	1630	2525
	Brit. E	3		865	1295	2415		580	1655	2555		580	1335	2555
Vowels	Am. E			730	1090	2440		390	1990	2550				
				645	1110	2540		415	1750	2470		610	1185	2565
				665	1145	2520		410	1755	2415		585	1155	2255
	Rom.		[a]	703	1278	2622	[ɪ]	317	2225	2940	[ə]	496	1479	2746

Table 15

The formant frequencies (in cps.) of the vowels of the English triphthong [aʊə] compared with those of the English vowels [a], [ʊ], and [ə] and the Romanian vowels [a], [u], and [ə]

Speaker/ language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Triphthongs	RA	6	[a]	790	1295	2195	[ʊ]	465	935	-	[ə]	615	1440	2485
	VC	2		770	1350	2520		460	915	-		640	1250	2390
	OR	5		755	1370	2310		450	910	-		540	1450	2290
	SI	6		745	1390	2510		510	1005	2170		650	1420	2350
	Brit. E	3		790	1295	2450		580	1010	2125		580	1295	2485

Table 15 (continuation)

Speaker/ language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Vowels	Am. E		[æ]	730	1090	2440	[ʊ]	440	1020	2240	[ə]			
				645	1110	2540		450	980	2360		610	1185	2565
				665	1145	2520		400	1015	2090		585	1155	2255
	Rom.		[a]	703	1278	2622	[u]	339	850	2507	[ʌ]	496	1479	2746

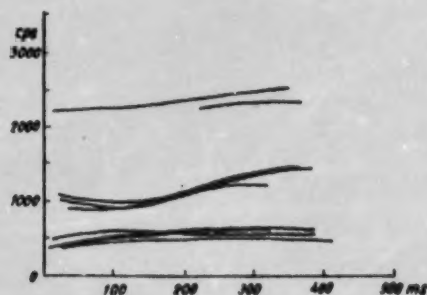


Fig.8.1. The diphthong [ʊə] in Rom. E
(pronounced by RA, VC, OR, SI)

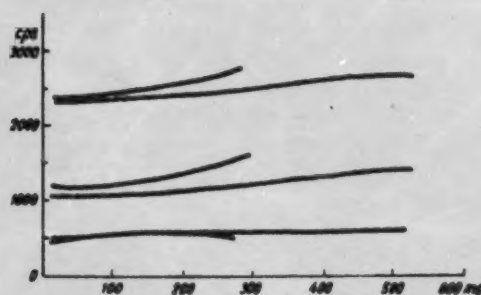


Fig.8.2. The diphthong [ʊə] in Brit. E

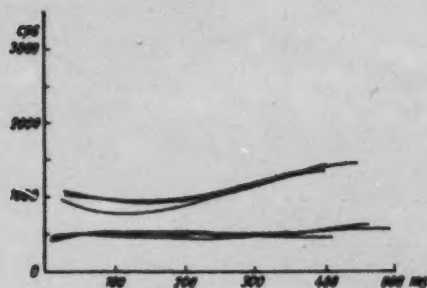


Fig.9.1. The diphthong [ɔɔ] in Rom. E
(pronounced by RA, VC, OR)

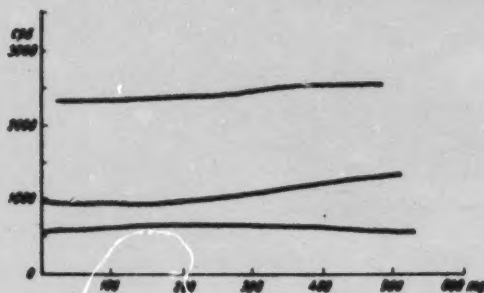


Fig.9.2. The diphthong [ɔɔ] in Brit. E

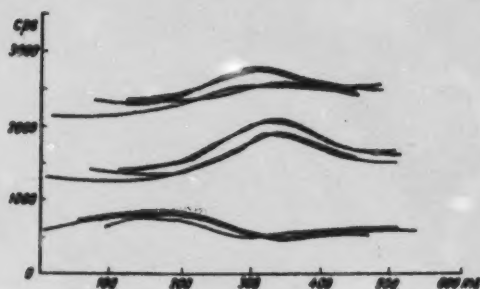


Fig.10.1. The triphthong [aɪə] in Rom. E
(pronounced by RA, VC, OR, SI)



Fig.10.2. The triphthong [aɪə] in Brit.E



Fig.11.1. The triphthong [aʊə] in Rom.S
(pronounced by RA, VC, OR, SI)

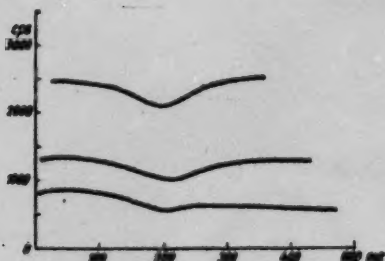


Fig.11.2. The triphthong [aʊə] in Brit.E

Table 16

The formant frequencies (in cps.) of the vowels of the English triphthong [eɪə] compared with the English vowels [e], [i], and [ə], and the Romanian vowels [e], [i], and [ə]

Speaker/ language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Triphthongs	RA	3	[e]	540	1985	2595	[I]	430	2230	2880	[ə]	580	1585	2555
	VC	3		565	2015	2530		480	2110	2560		610	1380	2380
	OR	3		530	2080	2650		395	2325	2890		510	1660	2610
	SI	3		570	2105	2675		540	2310	2785		615	1570	2440
	Brit. E	3		615	1730	2625		500	1835	2700		580	1370	2520
Vowels			[ɛ]	530	1840	2480		390	1990	2550				
	Am. E			570	1610	2465		415	1750	2470		610	1185	2565
				540	1705	2415		410	1755	2415		585	1155	2255
		Rom.		[e]	398	1934	2754	[I]	317	2225	2940	[ə]	496	1479

Table 17

The formant frequencies (in cps.) of the vowels of the English triphthong [oʊə] compared with those of the English vowels [o], [u], and [ə] and the Romanian vowels [o], [u], and [ə]

Speaker/ Language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F //		
				I	II	III		I	II	III		I	II	III
Triphthongs	RA	6	[o]	530	1455	2585	[u]	520	980	-	[ə]	500	1305	2740
	VC	2		570	1310	2305		435	975	-		560	1270	2275
	OR	4		540	1445	2390		500	1005	-		505	1425	2445
	SI	5		580	1515	2605		410	1140	2345		540	1545	2520
	Brit. E	3		615	1370	2450		430	1080	2195		580	1415	2595

Table 17 (continuation)

Speaker/ Language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Vowels	Am. E		[ɔ]	570	840	2410	[ʊ]	440	1020	2240	[ə]			
				505	880	2525		450	980	2360		610	1185	2565
				590	985	2365		400	1015	2090		585	1155	2255
	Rom.		[ɛ]	496	1479	2746	[u]	339	850	2507	[ɛ]	496	1479	2746
			[o]	413	984	2597								

Table 18

The formant frequencies (in cps.) of the vowels of the English triphthong [ɔɪə] compared with those of the English vowels [ɔ], [ɪ], and [ə] and the Romanian vowels [o], [i], and [ɛ]

Speaker/ Language		Num- ber of ca- ses	Sound	F			Sound	F			Sound	F		
				I	II	III		I	II	III		I	II	III
Triphthongs	RA	4	[ɔ]	540	1120	2390	[ɪ]	470	1085	2575	[ə]	545	1480	2530
	VC	4		610	1220	2270		570	1815	2525		590	1375	2360
	OR	3		565	1135	2415		490	1090	2590		590	1515	2470
	SI	4		580	1170	2385		375	1945	2595		550	1405	2390
	Brit. E	3		650	1010	2305		465	1585	2665		540	1335	2625
Vowels				570	840	2410		390	1990	2550				
	Am. E			505	880	2525		415	1750	2470		610	1185	2565
				590	985	2365		410	1755	2415		585	1155	2255
	Rom.		[o]	413	984	2597	[ɪ]	317	2225	2940	[a]	496	1479	2746

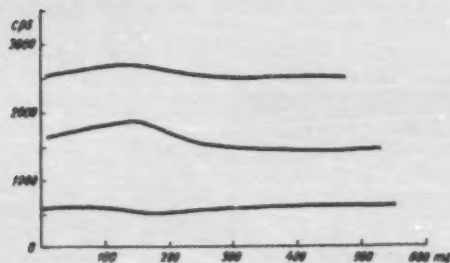


Fig.12.1. The triphthong [eɪə] in Rom. E
(pronounced by RA, VC, OR, SI)

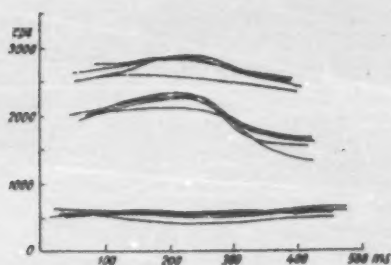


Fig.12.2. The triphthong [eɪə] in Brit. E

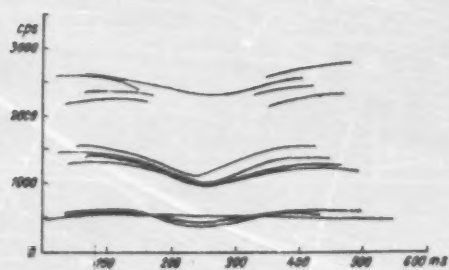


Fig.13.1. The triphthong [oʊə] in Rom. E
(pronounced by RA, VC, OR, SI)

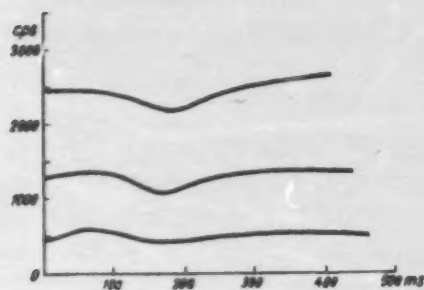


Fig.13.2. The triphthong [oʊə] in Brit.E

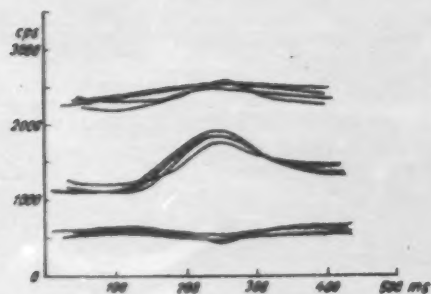


Fig.14.1. The triphthong [ɔɪə] in Rom.E
(pronounced by RA, VC, OR, SI)

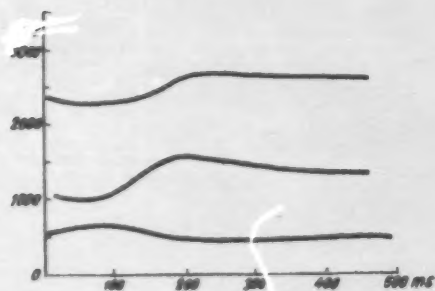


Fig.14.2. The triphthong [ɔɪə] in Brit.E

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^x Readings ... - Readings in Acoustic Phonetics, ed. by Ilse Lehiste, The M.I.T. Press, Massachusetts Institute of Technology, Cambridge, Massachusetts and London, England (1967)

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NOTES ON THE CONSONANT [ŋ] IN ROMANIAN AND ENGLISH

by Anca Uliivi

Before presenting the results of our observations, we find it adequate to mention some of the opinions of the Romanian and foreign linguists on nasal sounds, in general, and on the [ŋ] sound, in special.

Joseph Vachek establishes the phonological relation between [n] and [ŋ] in two large diachronic and synchronic studies, on the phonematic value of [ŋ] in modern English.¹

Most of the research workers of English have considered the nasal consonants [n] and [ŋ] "... as particularly clear and convincing instances of speech-sounds possessing the status of separate phonemes in that language, while in some other languages (such as Italian, Spanish, Czech, Hungarian) were variants of one and the same phoneme. As is commonly known, in these latter languages the velar [ŋ] only occurs before the velar consonants [k], [g], to the exclusion of the alveodental [n] which never occurs in such position, while in Mod. E both [n] and [ŋ] can be found in perfectly identical environments and, consequently, can differentiate word meanings".²

In the two works mentioned above, Vachek maintains the idea that in Contemporary English [ŋ] appears as an independent phoneme.

As a motivation, the author brings the older tendency of the English language of simplifying the group [ŋg] into [ŋ] before a consonant "It can even be supposed that the simplification of

1 Notes on the Phonematic Value of the Modern English [ŋ] Sound. In Honour of Daniel Jones, 1964, p.191-205 and On Peripheral Phonemes of Modern English, Brno Studies in English, IV, Prague, 1964, p.46-54.

2 J.Vachek, Notes, p.191.

[ŋg] before a consonant into [ŋ] was actually prompted by the tendency aimed at consolidating the position of the [ŋ] as an independent phoneme of the language, and that the vacillation between [ŋ] and [ŋg], ... may be regarded as manifestations of that tendency. Yet the situations in the present-day standard distinctly reveals that, in the long run, the tendency failed to achieve its purpose".³

Thus, the changing of [-ŋ]g into [-ŋ] in words like singer, singing, can be looked upon "... as an attempt to increase those positions in which the [ŋ] was allowed to occur, and thus as an attempt to consolidate the position of [ŋ] as an independent phoneme of English".⁴

In Romanian, the phonological position of [ŋ] compared with that of [n] is established by Em. Vasiliu in the chapter Contrastive Distribution, in the work Romanian Phonology⁵ " in Romanian, before a velar consonant [k], [g] there normally appears a [ŋ] sound; there also exists the pronunciation [n] : [benkə], instead of the normal pronunciation [bəkə]. We say that [n] and [ŋ] are in contrastive distribution, but not in commutation relation as well, since in Romanian there is no pair of words whose expression distinguishes itself only through the fact that one of the words contains a [n] and the other one a [ŋ]. Two terms in contrastive distribution, which are not in commutation relation are in free variation relation."

This is, in fact, the situation of [n] and [ŋ] in Romanian.

Emil Petrovici shows that, from an articulatory point of view, [n] + [k-] represents in Romanian, as well as in all the languages where the group nasal + velar exists, a homorganic group: "Dans le groupe [n] + [k-], le relèvement de la partie postérieure du dos de la langue pour aller se coller contre le palais mou et pour former l'occlusion du [k] doit coïncider avec le relève-

3 Ibidem, p. 199.

4 Ibidem, p. 198.

5 Em. Vasiliu, Fonologia limbii române, București, 1965, p. 32-33.

6 Ibidem, p. 32.

ment du voile du palais, ce qui constitue un des moments de la métastase de l' [ŋ].... D'habitude cependant, l'articulation vélaire précède le relèvement du voile du palais. Il se produira donc un son de passage qui sera nasal et aura une articulation vélaire. Celui-ci supplantera peu à peu l' [ŋ] , puisqu'il est plus fort, étant appuyé au [k] suivant, avec lequel il forme un groupe homorgane".⁷

Since [ŋ] exists in other languages as well, we shall make a few remarks on the situation of this consonant in other languages different from those which make the object of our work.

In Italian, for instance, "The occurrence of [ŋ] ... is completely predictable in terms of surrounding sounds: Italian [ŋ] occurs as the only nasal sound before /k/ or /g/, but nowhere else".⁸

In German, the presence of the phoneme [ŋ] is also due to the fact that it appears only when followed by velars. "Die Existenz des Phonemes /ŋ/ wird gewöhnlich aus den folgenden Minimalpaaren erschlossen :

[baŋ]	-	[ban]	,	[raŋ]	-	[ran]	,	['vaŋə]	-	['vane]	,
bang	-	Bann,		rang	-	rann,		Wange	-	Wanne	
[ʃliŋ]	-	[ʃlim]	,	['ziŋən]	-	['zineən]	,				
schling	-	schlimm		singen	-	sinnen					
[duŋ]	-	[dum]	,	[laŋg]	-	[lɛm]	,				
Dung	-	dumm		lang	-	Lamm					
[klaŋ]	-	[klam]	,	[ʃtraŋ]	-	[ʃtram]					
Klang	-	klamm		strang	-	stramm					

In his study, A Phonologic and Acoustic Classification of Polish Vowels¹⁰, W. Jassen shows that by recognizing the exist-

7 Emile Petrovici, De la nasalité en roumain, Recherches expérimentales, Cluj, 1930, p.27.

8 Frederick B. Agard, Robert J. di Prieto, The Sounds of English and Italian, Contrastive Structure Series, The University of Chicago Press, 1969, p.33.

9 Alexander V. Isačenko, Der Phonologische Status des velaren Nasals im Deutschen, Zeitschrift für Phonetik Sprachwissenschaft und Kommunikationsforschung, Akademie Verlag, Berlin, 1/3, 1963, p.83.

10 Zeitschrift für Phonetik, XI, 1958, 4, p.298-318.

ence of the phoneme [ŋ] in Polish, the necessity of introducing a "juncture phoneme" into the system is eliminated. "A pair like Irenka: i reka which is phonematically [i'rɛŋks] : [i'rɛŋke] in the Northern Standard has so far been interpreted as having a juncture phoneme (called morphoneme boundary) in the former case and no juncture phoneme in the latter. It has been maintained that /n/ is represented by [ŋ] directly before /k/ or /g/, and by [n] juncture plus /k/ or /g/. We submit that the two cases differ by the opposition /n:ŋ/.¹¹ Thus, the terms of the pair discussed above have no identical, but different phonemes.

Experimental Research. Results

In what will follow we shall try to present the results we have arrived at by means of a spectrographic analysis of the consonant [ŋ] in the English words pronounced by Romanian speakers; the consonant [ŋ] in these words was compared with the [ŋ] in the English speakers' pronunciation and with the [ŋ] in Romanian.

We have examined 20 recorded cases, the number of the subjects with whom we worked for the recordings on the spectrograph being three for the Romanian words and four for the English ones.¹²

Before mentioning the list of the analysed words, there should be made a few remarks on the possibilities of occurrence of the consonant [ŋ] in Romanian, in English and in other languages.

Thus, in Romanian, as well as in English, the consonant [ŋ] appears in different contexts, never initially.¹³

11 Ibidem, p. 305

12 The subjects used for pronouncing the English words were students of the English and German depts. grouped, from the point of view of their knowledge of English, in two categories: advanced - FF - 19 years old, OR - 20 years old and medium CA - 20 years old, DN - 26 years old.

13 Andrei Avram shows that "... the phonetic segment orthographically represented by i + n or n very often corresponds to a single sound, namely to a syllabic nasal" (cf. Interpretarea fonologică a lui [ɪ] initial în limba română, Fonetica și dialectologie, IV, 1962, p. 11). The material taken from the ALR is conclusive in this respect: [ŋ]:[ŋkide] ALR I, 1

In English, the final position is a "familiar context" for [ŋ].¹⁴ Beside this position, in English " /ŋ/ occurs usually after the short vowels /ɪ, ɛ, ʌ/, rarely after /ə/.¹⁵ The connection between the possibilities of occurrence of the velar [ŋ], in English, within the vocalic context is mentioned by Daniel Jones.¹⁶

In the introduction we have made a few remarks on the situation of [ŋ] in Italian and German. The essential difference among these four languages, in as far as the context in which the nasal velar appears is concerned, is the following: [ŋ] appears finally and before a vowel in English and in German and is not met in this position in Romanian and Italian.

The list of the words, grouped according to the position of the consonant we are dealing with, is, in the case of the English words: things, thinks, context VŋC, anger, singer, finger, longer, hanger, context VŋV and longing, banking, sing, sink, gong, bang-ing, banning, context - ŋ.

For the Romanian words, the contexts taken into account were V...kV, bancă, luncă, V...gV, lingă, lungă and V...g# , miting, gong.

The measurements were made on sections performed in the central region of the segment corresponding to the duration of the respective consonant. In some instances, for technical reasons, the section is nearer to the beginning or the ending of the consonant [ŋ] .

(continuation page 77)

p.119, MN (question 3803), p.192; [ŋ]:[ɪ] ALR II 1, p.119, MN (question 3805), p.219. [ŋkɪdʒ] Ibid., p.119, MN (question 3803), p. 76 (cf. A.Avram, op.cit., p.11). Thus [ŋ], which can be interpreted either as a variant of /n/ or as an achievement of the archiphoneme /N/, makes the phonetic segment spelt in or in to correspond to a single phonological unit (Ibidem, p.10).

- 14 André Malecot, Acoustic Cues for Nasal Consonants, Language, 32, 1956, p.277.
- 15 A.C. Gimson, Introduction to the Pronunciation of English chapter The English Consonants-Nasal Release, London, 1965, p.192.
- 16 An Outline of English Phonetics, chap. The English Nasal Consonants, Cambridge, 1967, p.170.

When we could not determine a formant with certainty, on the narrow-band section, we have used the wide-band spectrogram, determining the first three formants of the consonant which formed the object of our discussion.

The results of the measurements are presented in the following tables. The tables represent a synthesis of the measurements for the 6 subjects: the inferior and the superior limit of the frequency variations of the formants and of their medium values for the respective consonant are indicated.¹⁷

English words

Table 1

V ɲ C

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases ^x	H _z	Number of cases	H _z	Number of cases	H _z
things	4	216-288 <u>234</u>	4	792-1080 <u>936</u>	4	1520-2340 <u>1862</u>
thinks	4	216-252 <u>225</u>	4	792-1080 <u>936</u>	4	1500-2090 <u>1723</u>

- x Since the results of the measurements for the advanced and the medium stage subjects are identical or have very close values, we have grouped them in the same table.

17 We found the typical distribution of the formants of the English nasal consonants, and as such, that of /ɲ/ as well, in J. Kacprowski's work Synteza polskich spółgłosek nosowych, Rozprawy Elektrotechniczne IX, 1963, p.452.

V 7 V

Table 2

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases	H _z	Number of cases	H _z	Number of cases	H _z
anger	4	216-252 <u>225</u>	4	864-1008 <u>918</u>	4	1440-1944 <u>1771</u>
singer	4	216 <u>216</u>	4	792-1080 <u>918</u>	4	1728-1800 <u>1764</u>
finger	4	216-252 <u>225</u>	4	864-1080 <u>960</u>	4	1728-2304 <u>1980</u>
longer	4	216-252 <u>225</u>	4	720-936 <u>864</u>	4	1656-1872 <u>1746</u>
hanger	4	216-288 <u>234</u>	4	720-1008 <u>914</u>	4	1588-1872 <u>1783</u>

Table 3

- 7 -

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases	H _z	Number of cases	H _z	Number of cases	H _z
1	2	3	4	5	6	7
longing	4	216 <u>216</u>	4	720-1080 <u>954</u>	4	1440-1944 <u>1746</u>
banking	4	216-252 <u>225</u>	4	720-1008 <u>844</u>	4	1512-1800 <u>1674</u>
sing	4	216 <u>216</u>	4	720-1080 <u>882</u>	4	1440-2376 <u>2034</u>
sink	4	216-252 <u>225</u>	4	720-1584 <u>1026</u>	4	1440-2376 <u>2049</u>

Table 3 (continuation)

1	2	3	4	5	6	7
gong	4	216-252 <u>225</u>	4	870-1008 <u>973</u>	4	1440-1872 <u>1656</u>
banging	4	216 <u>216</u>	4	792-1080 <u>936</u>	4	1892-2376 <u>2070</u>
banning	4	216-252 <u>225</u>	4	720-1008 <u>844</u>	4	1512-1728 <u>1608</u>

Romanian words^x

V---kV

Table 4

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases	H _z	Number of cases	H _z	Number of cases	H _z
bancă	3	216 <u>216</u>	3	792-1008 <u>890</u>	3	1728-2088 <u>1872</u>
luncă	3	216 <u>216</u>	3	792-1008 <u>936</u>	3	1724-2160 <u>1894</u>

- x Since the Romanian words recorded by the analysed subjects for the English words could not serve the comparison between the English and the Romanian [ŋ], we made new recordings with three research workers from the Phonetical and Dialectal Research Centre (MC - 26 years old, CB - 28 years old, LT - 32 years old).

V---gV

Table 5

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases	H _z	Number of cases	H _z	Number of cases	H _z
1	2	3	4	5	6	7
lingă	3	216 <u>216</u>	3	720-870 <u>794</u>	3	1800-2088 <u>1968</u>

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Table 5 (continuation)

1	2	3	4	5	6	7
lungă	3	216-288 <u>240</u>	3	792-1008 <u>864</u>	3	1800-2160 <u>1984</u>

Table 6

Record- ed words	F ₁		F ₂		F ₃	
	Number of cases	H _z	Number of cases	H _z	Number of cases	H _z
miting	3	216-252 <u>228</u>	3	792 <u>792</u>	3	1994-2088 <u>2056</u>
gong	3	216 <u>216</u>	3	792-1008 <u>912</u>	3	1800-2088 <u>1968</u>

In Preliminaries to Speech Analysis¹⁸, R. Jakobson, G. Gunnar, M. Fant and Morris Halle, discuss in the chapter Resonance Features, the nasal consonants within the opposition compact-diffuse.

The [ŋ] consonant belongs to the category of compact consonants, having from an acoustic point of view the following characteristics: "In the consonants compactness is displayed by a predominant formant, centrally located, as opposed to phonemes in which a non-central region predominates. The compact nasals have a dominant formant region between the characteristic nasal formants (200 cps and 2500 cps)".¹⁹

For the first formant, the formant values, recorded in the case of the English words, have varied between 216 - 234 Hz, and for the last formant (the third one), between 1608-2070 Hz.

We found the highest values for [ŋ] in final position, namely F₃ has varied between 2034 H_z and 2070 H_z.

Similar results have also been obtained for [ŋ] in final position in Romanian (F₃ having the value of 1968 H_z, respectively

¹⁸ Acoustic Laboratory, Massachusetts, Institute of Technology, 1952, p.26-29.

¹⁹ Ibidem, p.27.

2056 H₂ in the Romanian words miting, gong.

For the other contexts, although different, we have obtained similar results in value, both in English and Romanian.

From the point of view of the contrastive analysis the pronunciation of final [ŋ], by the Romanian speakers, in English words represents an interesting situation.

The examining of the sonagrams shows that in the English words, when pronounced by the Romanian speakers the final [ŋ], when it is not correctly rendered, is replaced, more rarely, with (dental)²⁰ n or, more often, by the group [ŋg].

From the point of view of the distribution of the two nasals in Romanian, both situations correspond to what is "normal" for a speaker of Romanian.

[ŋ] has been rendered by the speakers of Romanian who have been tested, by [ŋ] + [g], in contexts which were not familiar to them, (VŋC), according to the habits linked with their mother tongue.

In both of the above-mentioned cases, we have noticed, on the sonagrams, that beside the formant structure characteristic of the so-called velar nasal, there existed a specific spectral configuration of a plosive ([g]) included in the spectrum of the Romanian [ŋ].

20 Cf. V. Ștefănescu-Drăgănești, Contrastive Analysis of the Consonants of English and Romanian, The Romanian English Contrastive Analysis Project. Reports and Studies, Bucharest, 1971, p.103: the Romanian subjects which have been tested: ... can never pronounce the allophone /ŋ/ in final position. Following this, thing is pronounced as thin /θin/, wing /wɪŋ/ as win /wɪn/.

In the same way, we can mention the difficulties encountered by the French speakers and of those of the German speakers, as well, when pronouncing the English [ŋ]. In French, for instance there exists the tendency: "... to replace it

by the palatal nasal ɲ, especially when a front vowel precedes. ɲ is the ordinary French 'a mouillé' as in montagne [mɔ̃'taɲ]. French people have to remember that for the English ɲ the contact of the tongue with the palate is much further back than for the French ɲ. It is often useful for them to practise the sound ɲ with the mouth very wide open" (D. Jones, op.cit., p.171-172). The German speakers learning English "... have a tendency to replace final ɲ by the sequence ɲk, thus confusing for instance sing [sɪŋ] and sink [sɪŋk]. This defect may be remedied by pronouncing final ɲ very long, thus [sɪŋ:] (Ibidem, p.172).

This situation has direct implication on the duration: generally longer, in the case of the English [ŋ], as compared with the Romanian [ɲ], which is shorter, because a part is represented by the plosive [g].

English words^x

Table 7

Context	Number of cases	Average
VŋC	2	156,2 ms.
VŋV	4	118 ms.
-ŋ	4	158,8 ms.

Table 8

Context	Number of cases	Average
V...kV	2	112 ms.
V...gV	2	138,7 ms.
V...g#	2	126,2 ms.

x We have taken into account a number of words which included the three contexts under consideration.

Conclusions

1. Both in Romanian and in English the [ŋ] consonant appears in different contexts and never initially.

2. We have noticed that in both languages, in the case of the velar [ŋ], there exists a nasal formant common to all the nasal consonants, towards 1900 - 2100 Hz (F_3) and of a very low formant F_1 , towards 250 Hz.

3. The examining of the results of the measurements performed has allowed us to obtain some similar results in value, both for the English words and the Romanian ones.

4. In as far as the duration of this consonant is concerned, we could notice, at least for the cases analyzed, that the shorter

duration of the Romanian [ɣ] as compared with the English [ɣ] , which has "won" in the dispute [ɣg] - [ɣ] , being considered , in spite of that, today, ... "as a peripheral phoneme of the language".²¹

21 J. Vachek, On Peripheral ..., p. 54.

THE INTERPRETATION OF THE ENGLISH VELAR NASAL
BY ROMANIAN LEARNERS OF ENGLISH

by Hortensia Parlog

The present paper contains some observations concerning the perceptual and productive interpretation of the English velar nasal by Romanian speakers.

In Romanian the velar nasal /ŋ/ exists only as an allophone of the Romanian dental nasal /n/ before the velar stops /k//g/. According to E. Vasiliu, in this position /ŋ/ is in free variation with the Romanian dental nasal.¹

e.g. arunc /a r uŋk//a r u n k/
alung /a l uŋg//a l u n g/

An analysis of the distribution of the Romanian allophone and of the English velar phoneme shows that neither sound occurs in initial position. /ŋ/ occurs finally, as -C, only in English; in final position two-consonant clusters, -C₂C₁, it occupies the position of -C₂ (i.e. penultimate) in both languages. (e.g. English bank, Romanian banc.) In final position three-consonant clusters, -C₃C₂C₁, it occupies position -C₃ (e.g. English linked, Romanian punct). In intervocalic position the sound occurs, of course, by itself only in English (e.g. English singing). In combination with an other consonants in this position, it always occurs in first position in both languages (in the case of Romanian the "other" consonant being always a velar). (e.g. English linguist, Romanian lingvist.)

We think it is important to mention that in English /ŋ/ is

1 Emanuel Vasiliu: "Fonologia limbii române", Ed. Științifică, București, 1965, p.127.

always represented orthographically as n followed by g, k or x, which might suggest to the Romanian learner of English the presence of a velar stop after the nasal (e.g. ink, English, sinx).

The distribution of the sound in the two languages is given in the following tables (only simple words in isolation have been taken into account) :

Final cluster -C₂C₁

	C ₂	k	g	d	z	θ
English	ŋ	+	-	+	+	+
Romanian	ŋ	+	+	-	-	-

E.g. English: link, ringed, rings, length
Romanian: tanc, lung

Final cluster -C₃C₂C₁

English	C ₃	C ₂	C ₁	t	s	θ	ts	l
	ŋ	k		+	+	+	+	+
	ŋ	g		+	-	-	-	-
	ŋ	θ		-	+	-	-	-

E.g. linked, links, strengths, instincts, amongst, lengths, wrinkle

Romanian	C ₃	C ₂	C ₁	t	s
	ŋ	k		+	+

E.g. punct, sfinx

Final cluster -C₄C₃C₂C₁

English	C ₄	C ₃	C ₂	C ₁
	ŋ	k	s	t
	ŋ	k	θ	s
	ŋ	k	l	z

E.g. jinxed, strengths, wrinkles

Romanian

- -

Intervocalic cluster -CC-

English - ɳ + k , g , θ , s -

E.g. anchor, anger, lengthen, anxiety

Romanian - ɳ + k , g -

E.g. arunca, alunga

Intervocalic cluster - C₁C₂C₃ -

English	C ₁	C ₂	C ₃	θ	s	t	l	w
ɳ k			+	+	+	+	+	-
ɳ g			-	-	-	-	+	+
ɳ s			-	-	-	+	-	-

E.g. anxious, strengthen, minxes, tincture,
tinctorial, wrinkling, English,
anguish, youngster

Romanian	C ₁	C ₂	C ₃	l	r	ɳ	v	t
ɳ k			+	+	+	+	-	+
ɳ g			+	+	-	-	+	-

E.g. inclina, increți, lungsor, francmason,
puncte, panglică, gangrenă, lingvist

By comparing the role and distribution of the sound in the two languages we can make the following predictions regarding the interpretation of the English phoneme by Romanian speakers:

1. In the environment of a velar stop the velar nasal will be produced with phonetic accuracy, but will probably be misinterpreted as an allophone of / n / with velarity viewed as a contextual rather than a distinctive feature - an example of covert interference. Perceptually it will be interpreted as / n /.
2. When the velar nasal occurs by itself in final or intervocalic positions, or it is followed by consonants other than / k / or / g /, it will again be interpreted as an allophone of / n /, either a dental nasal / n / or a sequence of velar nasal plus velar stop / ɳ k / or / ɳ g /.

Exp. B. bang > RoE / bæn / / bæŋ / / bæŋk /

B. singing > RoE / sinin / / s iŋk iŋk / / s iŋg iŋg /

In order to verify the predictions made we have used tests of perception and production, in which the sound /ŋ/ occurs in five contexts : - # , - k # , V - V, V - kV, -C (finally, before final voiceless stop, intervocalically, and before another consonant (in penultimate position).

E.g. bang, ink, singing, sinker, wings

In the perception test a total of 82 items containing /ŋ/ were recorded on magnetic tape, in contrast with the other nasals, in all positions, in both sentence contexts and as single words. The recordings were made by a Romanian teacher of English whose productions were checked for accuracy by a native speaker of English. The recordings were played to a group of five subjects. The three English nasals were assigned numbers and the informants were asked to transcribe what they heard using + symbols. In a second perception test they were asked to identify the aberrant item among three by circling a number on answer sheet.

A list of 78 items was compiled for the production test; informants were required to read these items and their responses were recorded.

The subjects were university students specialising in English who had also attended courses in phonetics. One of the subjects also spoke French.

Results

Unfortunately the informants became aware immediately that the object of the investigation was the velar nasal, and concentrated all their attention on that sound. However the influence of this fact remains unclear.

It should also be noted that a correct answer on the perception test may simply indicate that the subject heard a difference between the tested phoneme and the one with which it is contrasted, but it does not prove that he heard it correctly.

Such covert misinterpretation may be reflected in the small number of errors made by the subjects when interpreting minimal pairs as compared with the relatively large number of errors occurring when the same sound was presented in minimal triplets (since the choice involved three terms and not two and chance was a smaller factor).

The fact that the subjects knew or did not know the word in which the velar nasal occurred may have influenced their responses. Some words may have been correctly interpreted because they were part of the informants' active vocabulary. A large proportion of the errors were in the interpretation of the velar nasal in meaningless words (e.g. rinning, lonner, hanner, rin, etc.).

Perception of the sound

The greatest number of errors occurred in the interpretation of the velar nasal in intervocalic position, not followed by another consonant (e.g. singer, singing). Three of the subjects perceived it as followed by / g /. The spelling of the word may have also influenced the interpretation of the sound; when one of the tests was repeated, two of the five informants transcribed /ŋ/ as followed by a voiced velar stop / g / in words like bringing, hanging, longing, perhaps recalling their written forms. On the earlier administration of the test, they had transcribed it correctly.

The two subjects who made the fewest mistakes, most frequently committed errors when the /ŋ/ was in the context of meaningless words (e.g. brinning, sprinning, etc.).

The pairs which differed minimally in final position were correctly perceived by three of the subjects; the other two confused /ŋ/ and / n / and one of them even perceived the velar nasal /ŋ/ as the bilabial nasal / m /.

Fewer errors occurred in the interpretation of the /ŋ/ followed by / k / in final and intervocalic position. The velar / k / was always perceived by the subjects, although three of them interpreted it as its counterpart / g /.

Production of the sound

Three tendencies could be noticed in the production of the English velar nasal by the five informants:

1. The production of /ŋ/ was usually accompanied by a velar stop, voiced or voiceless, regardless of the context.
2. One subject consistently produced the velar nasal as the dental nasal / n /.
3. One subject usually palatalized the velar nasal; this subject was the speaker of French.

All subjects had difficulty in producing /ŋ/ in intervocalic position. Where the /ŋ/ was pronounced correctly intervocalically, a velar nasal in the following syllable was likely to be accompanied by a velar stop (e.g. bringing / b r i ŋ i ŋ k /). On the other hand, if the final nasal was correctly produced, the intervocalic nasal was likely to be followed by a velar stop.

One of the subjects who pronounced the velar nasal correctly when followed by a front vowel (e.g. / i /), was unable to produce it when followed by / ə / (e.g. bringer). By contrast, another student rendered the sound correctly only when followed by / ə / , and incorrectly when followed by / i / .

All the subjects introduced a velar stop between the /ŋ/ and any following consonant (e.g. brings / b r i ŋ g z / . wings / w i ŋ g z /).

In a significant number of cases the dental nasal was interpreted hypercorrectly as the velar nasal.

We may say, as a very general conclusion, that the dominant error in the perception of the English velar nasal by the Romanian speakers was its confusion with the dental nasal / n / ; while the dominant error in its production was following it by a velar stop.

The prediction yielded by a contrastive analysis of the nasal subsystems of English and Romanian regarding the interpretation of the velar nasal was in general confirmed by the results of the test. However the predictive achievement is diminished by the following facts:

1. The predictions were of so general a nature as to permit such widely variant interpretations of the velar nasal at either

a dental or a velar nasal allophone with environmental /k/ or /g/.

2. The predictions offered no hint that the perceptual interpretation (as /n/) would differ from the productive interpretation (as /ŋ/ /ŋk/ /ŋg/):

3. The hypercorrect interpretation of the dental nasal /n/ as a velar nasal /ŋ/ was also totally unexpected.

The hypercorrect interpretation offers an interesting parallel to the results obtained in a test also concerned with the English nasals administered by Albert Marckwardt to native speakers of Spanish, where such interpretation were also frequent.²

It would be of considerable interest to extend our knowledge of the interpretation of the velar nasal to speakers of numerous other languages of varying phonological structures.

In general it appears, for example, that Spanish speakers would favour the Romanian perceptual interpretation of /ŋ/ as a dental allophone of /n/, although in syllable final position neutralization of all nasal phonemes is common in Spanish-English. On the other hand Hungarian learners of English apparently prefer the productive interpretation of /ŋ/ as a sequence including the velar nasal plus a velar stop.³

However, the correlations between such different interpretations and structural variation among languages remain unclear.

2 Albert H. Marckwardt : "Phonemic Structure and Aural Perception" in William Hemsler, "An Experimental Study of Phonological Interference in the English of Hungarians", Indiana University, 1971, pp.13-14.

3 William Hemsler - Francis Juhász : "A Contrastive Analysis of Hungarian and English Phonology" American Council of Learned Societies Research and Studies in Uralic and Altaic Languages, Project no.70, 1964.

THE NEW ENGLAND DIALECT AND ROMANIAN LISTENERS

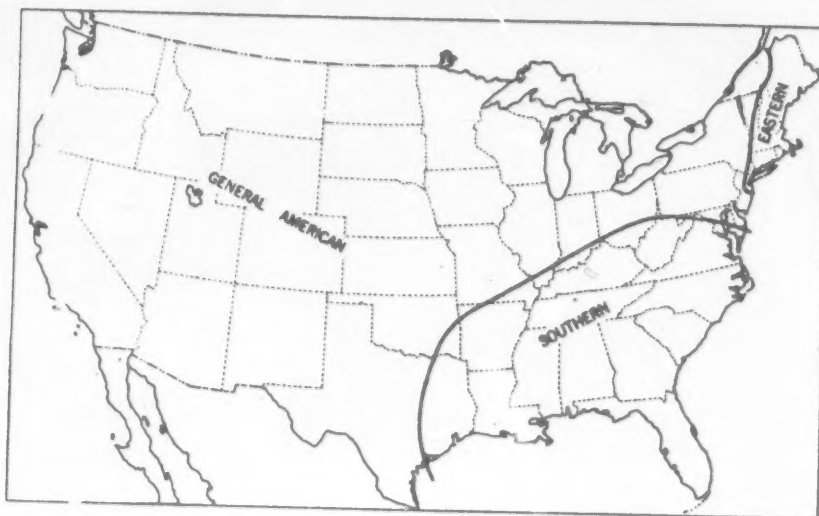
by Dr. Donald R. Stoddard
Visiting Lecturer in American Literature
Babeş-Bolyai University, Cluj, Romania

The proverbial "Man is what he eats" and the existential "Man is what he is" are supplemented by a new maxim for the 1970's: "Man is what he throws away", that is, we can take the measure of a man by examining the contents of his waste basket and trash can. The measure of a foreign speaker, however, is affected measurably by the things he is unable to throw away, and particularly - for the speaker of English - those ingrown dialect habits that distinguish his speech from the general run of British and American speech that is characteristically regarded as the norm for English speakers in Romania.

Since many listeners soon learn to disregard insignificant phonetic variants and to pay careful attention to differences that affect perception and understanding, foreign listeners may experience extra difficulties when coping with well established dialect patterns that are difficult if not impossible for certain American speakers to shed. As Raven McDavid has stated, ".... one's speech is the most intimate aspect of one's behavior, the most automatic and least susceptible to conscious alteration..." Using my experience as a New Englander teaching English in a Romanian University, together with a consideration of the generally accepted earmarks that separate the New England dialect from a "General American" dialect, I hope to examine the peculiarities of New England English that are likely to cause problems in understanding for Romanian listeners and, perhaps, to forward some suggestions for ameliorating ambiguities and avoiding false speech

cues. My concern will be with general New England speech (area A on the enclosed map), with the full realization that not all speakers from this dialect area will exhibit all of these generally characteristic traits.

One of the verbal ambiguities that causes difficulties for Romanian listeners is the New Englander's use of [ɑ] in "short o"



The 3 Major Regional Speech Areas

(Source : Arthur J. Bronstein : The Pronunciation of American English, p.44. Copyright. 1960. New York : Appleton-Century-Crafts)

words like crop or fog and, without any distinction, in words like fought or law. This usage results in ambiguities in the following homonyms which are usually distinguished by speakers of a General American dialect who use [ɑ] for the first word of these pairs, and [ɔ] for the second word :

He slept on a cot. The thief was caught.
 I fished for cod. The crow cawed.
 This prevents wood rot. What hath God wrought ?
 I hope not. He did naught.

The little tot was taught.
The taxidermist had to hock his hawk.
Don your costume. Dawn has risen.

And the following pairs :

yon - yawn
pod - pawed
hod - hawed
set - saught
sod - sawed
collar - caller

The obvious cure for such a problem is for the speaker to distinguish the vowel sounds clearly and unequivocally. Putting this



The Ten Major Regional Speech Areas: A: Eastern New England; B: New York City; C: Middle Atlantic; D: Southern; E: Western Pennsylvania; F: Southern Mountain; G: Central Midland; H: Northwest; I: Southwest; J: North Central

(Source : Charles K. Thomas, An Introduction to the Phonetics of American English, 2d Ed., p.252. Copyright, 1958. New York: The Ronald Press)

panacea into action, however, is not so easy. Many New Englanders are unable to distinguish them with any regularity, even with practice. Moreover, in rapid conversation or when one concentrates on the sense rather than the sound, the old ambiguity creeps unnoticed back into the New Englander's speech. What might prove successful for many speakers, at least part of the time, is a conscious lengthening of the vowel in such words as caught, dawn, sought, etc., and the normal pronunciation of the vowels in cot, don, sot, etc. This will allow listeners to distinguish the sounds by something more than context whenever the speaker is able to remain conscious of the need to distinguish them.

Many New Englanders omit the /-r/ that Romanian listeners have learned to expect in such words as barn, ear, beard, bargain, father, and the last syllable of mirror. In such words as barn and bargain, the omission is complete; in ear, beard, father and mirror, however, the r is replaced by /ɜ/. New Englanders do preserve the /r/ sound before vowels: e.g., arrest, parrot, very, story, morrow, berate, deride, caring, around. A few words show both the preserved and dropped /-r/ 's: error, mirror. I should point out that speakers from Nantucket, Martha's Vineyard, and Marblehead, Massachusetts - places known as "r islands" - preserve the final /-r/ that most New Englanders drop.

Perhaps in an effort to maintain a cosmic balance, The New Englander compensates for dropping a few /r/ 's by using the linking or intrusive /r/ in such expressions as "We saw him", or "The Idea of it", or "The law of the land". These usages, understandably, cause my students unusual difficulty, although the usual slowing down that accompanies speaking to foreigners often ameliorates or eliminates the extra /r/. Unlike the undistinguished [ɑ] and [ɔ] discussed above, this regional variant can be somewhat overcome by practice and care. Many New Englanders have almost completely eliminated this New Englandism from their speech after moving to the Western or Mid-Western United States, principally because of the mirth or undue attention it invites. This speech localism, also, is more readily perceivable by ordinary speakers and listeners, whereas it takes considerable speech sophistication to differentiate [ɑ] and [ɔ].

Perhaps the most noticeable New England speech trait to American listeners from other regions is the so called "broad a", phonetically [a], phonemically /a/, found inconsistently in path, bath, glass, afternoon, France, etc. Although the inconsistency of usage may cause problems for listeners, the basic similarity between the New England pronunciation of these vowels and British usage makes this American variant more easily understood for most Romanian listeners than General American or Southern pronunciation would be. (One has only to listen to current English lessons on Romanian television or to examine English textbooks used in Romanian lyceums and universities to see how much more British than American the "standard" English for Romanians is in both sound and vocabulary.) e.g., [næʊ, æ hævnt gæls spæʊŋ] occurred in a recent (November, 1972), television English lesson.

Three other noticeable traits in New England pronunciation ought to be mentioned, although none of the three seems to cause any particular problems for Romanian hearers. New Englanders generally use /uw/ after t, d and n in such words as Tuesday, news, or duty; /w/, /ɪw/, or /yʊw/ in words like these are rarely heard.

A more shortened and more centralized allophone of /o/ can be noticed in the New Englander's stone, coat, or note. The difference may be noticeable to Romanian listeners, but it creates no problems of ambiguity; in fact, the prevailingly British norm probably makes it sound more characteristic.

Lastly, in words such as gar, beard, fear, etc. /ih/ appears with a high allophone of /i/. Again, though noticeable, this New Englandism is hardly likely to cause understanding problems for Romanian listeners or students, since no ambiguity results.

Most of the New England regional variants in morphology or syntax are rural or non-educated usages, such as "agin him" for "against him", "waked up" for "woke up", or "driv", "div", and "ris" for "drove", "dove", or "rose". It is hardly likely that most exchange personnel or cosmopolitan travelers will provide such verbal puzzles for Romanian audiences.

Vocabulary variants are not numerous, although Romanian students of literature or avid readers of books and periodicals may

encounter a few strange terms such as buttonwood for sycamore (tree), tonic for soda pop or soft drink, or grinder or sub (marine sandwich) for the enormous sandwiches made from a loaf of Italian bread slit lengthwise and known as a hoagie in New York City and a hoagie in Philadelphia. Many New England terms have to do with farm or kitchen terminology, such as pig sty for pig pen, apple dowdy for deep-dish pie, bonny clapper or clabber for curdled milk, or sour-milk cheese for cottage cheese. In general, it seems unlikely that New England vocabulary will cause any more problems for Romanian readers or listeners than strange terms from the General American dialect that send him to one or more dictionaries for assistance.

From these observations it is clear that the notion of "dialect" in American English is far less significant than in British English, where substantial difficulties of expression and understanding may occur between speakers from different regions. With the exception of the Gullah dialect spoken on the sea islands and nearby coasts of South Carolina and Georgia, the dialect differences of American English are relatively few. Some, however, do persist, and it is worthwhile to take notice of them and to try to predict and to ameliorate the communication problems they may cause for Romanian listeners.

GLOTTAL CONSTRICTION IN ENGLISH AND ROMANIAN

by Dr. Robert W. Bley-Vroman

It has often been noted that there are differences between English and Romanian in the pronunciation of voiceless consonants. In particular, in syllable - initial position English voiceless stops are pronounced with tightening of the muscles of the vocal tract resulting in an increase of pressure behind the closure, so that, when the stop is released a "puff of air" follows. Thus we say that in English voiceless initial stops are "tense" or, derivatively, "aspirated". In Romanian, as in many languages of course, there is no such tenseness and corresponding aspiration. These facts contribute in a straightforward way to a Romanian accent in English and to an English accent in Romanian.

But facts about the pronunciation of consonants at the end of syllables are less widely studied. There are many interesting aspects of non-initial consonant articulation, but here we deal with just one: the state of the glottis. One reason this problem has received relatively little attention is the difficulty of observing glottal constriction. Spectrograms are difficult to interpret in this domain, and the techniques of direct photographic observation, requiring that a bundle of light-conducting fibers be inserted into the throat, are not conducive to natural relaxed speech. It seems to me now that the best data at present come from impressionistic and introspective phonetics. The data in this report are, accordingly, based on what I hear and what I feel in my throat.

Students of linguistics are aware that many languages employ a series of glottalized consonants; so that alongside p, t, k there is for example also p', t', k', where the raised comma in-

dicates glottalization. The glottalized series is produced by closing the glottis during the articulation of the consonant. Usually, in very close sequence, the glottis is closed; the consonant is articulated and released; and the glottis is reopened. The complete closure of the vocal tract from the lungs during articulation gives the consonants a kind of hollow, echoey sound. Naturally, voicing is impossible with the glottis closed: there is only a voiceless series of glottalized consonants.

Glottalized consonants occur with great frequency in American Indian languages, particularly those of Mexico and of the northwest United States. It is thus no accident that it was a student of Nootka, James Hoard of Vancouver, British Columbia, who first pointed out to me that, interestingly, in English at rapid speed and low volume, voiceless stops are clearly glottalized in syllable non-initial position. That is, before the articulation of the consonant there is a marked and audible glottal constriction and often complete closure at least into and often throughout the consonant articulation. A consonant in the position is often unreleased, and the glottalization is not acoustically obvious. But compare the pronunciation of the following pairs. (? before a consonant indicates glottal constriction.)

stop [staʔp]

but [bʌʔt]

cake [keiʔk]

stopper [stəpə]

butter [bʌtə]

naked [neikəd]

In the first of each pair the stop is in final position and is thus glottalized. In the second of each pair there is no glottalization. Occasionally, these stops are released and the hollow sound of glottalization is clear.

The conditions for the glottalization are not entirely clear. The notion "syllable non-initial" itself begs many important questions. In addition, there are restrictions on the preceding segment. If, for instance, a continuant precedes no glottalization takes place: rat [raeʔt] but raft [raeft]. Indeed if the preceding is anything but a vowel or a voiceless stop, there is no glottalization. Roughly then, the rule must be:

$$\left[\begin{array}{c} \text{stop} \\ \text{voiceless} \end{array} \right]_a \rightarrow [\text{glottalized}] / \vee \left(\left[\begin{array}{c} \text{stop} \\ \text{voiceless} \end{array} \right] \right)$$

where a is in syllable non-initial position

The conventions of the Sound Pattern of English predict that this rule will apply simultaneously to both final stops in a word like stopped, so that both are glottalized. And indeed this is the case, lending support both to our formulation of the rule and to the conventions of SPE.

But observe that [voiceless, stop] appears twice in this rule. This is surely not accidental: the reason that a voiceless stop can intervene is just because exactly that consonant can itself be glottalized. The rule is surely:

$$\left[\begin{array}{c} \text{stop} \\ \text{voiceless} \end{array} \right]_a \rightarrow [\text{glottalized}] / \vee$$

where a is in syllable non-initial position

And then a rule of Glottalization Assimilation, which is common in languages, will follow:

$$\left[\begin{array}{c} \text{stop} \\ \text{voiceless} \end{array} \right] \rightarrow [\text{glottalized}] / [\text{glottalized}]$$

(Our two rules can now be collapsed thus :

$$\left[\begin{array}{c} \text{stop} \\ \text{voiceless} \end{array} \right] \rightarrow [\text{glottalized}] / \left\{ \begin{array}{c} \vee \\ [\text{glottalized}] \end{array} \right\}$$

But such a collapsing raises serious problems of rule ordering, since iterative application of the rule would be required. It is not yet clear whether phonological theory should allow rules to apply iteratively.)

Consider now some seemingly unrelated phenomena:

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<u>hand saw</u>	[haensə]
<u>raised window</u>	[reɪzwindo]
<u>skinned knee</u>	[skinni]
<u>cold yeast</u>	[kolyɪst]
<u>beasts</u>	[bi:st]
<u>last window</u>	[la:swindo]
<u>first problem</u>	[fɜːsprəbləm]
<u>acts</u>	[æks]

More examples can be introduced to make the field complete. The generalization is well-known: roughly, dental stops are lost between consonants:

$$\left[\begin{array}{c} C \\ \text{dental} \end{array} \right] \rightarrow \emptyset / C \_\_\_ C$$

We will not deal with this process in detail but note only that it interacts with the process of glottalization in an interesting way.

Recall that in a form like lot or like cop, glottal constriction and often closure precedes the t and p: [laʔt], [caʔp]. Consider now the plurals of these words /lot+s/ and /cop+s/. By Glottalization they become loʔts and coʔps. But now in the form loʔts, since the t is between the consonants ʔ and s, the rule of dental loss is applicable, and the t should drop. That is, the independently required rules of Glottalization and Dental Loss combine here to predict phonetic laʔs. And this is, gratifyingly, exactly the correct form. (The transcription of the vowel does no interest us.)

This treatment thus gives an explanation for the apparent "substitution" of ʔ for t in these cases by tying the phenomenon to other general facts of English phonology. Notice that no ad hoc rule of t → ʔ is needed, contrary to many traditional descriptions.^x

^x I understand that a similar solution to mine may have been proposed by David Stampe of Ohio State University in unpublished work.

Romanian has to my knowledge no similar glottalization. This difference presents of course difficulties for language learning. Americans, for example, typically glottalize Romanian final consonants, just like English ones. Thus for Romanian tot we hear to ʔt ; for pop, po ʔp ; for lac, la ʔq ; etc.

And because of the interaction of Glottalization and Dental Loss, ʈi and ʈ when not syllable initial are pronounced ʔg. Thus știți [ʈiʔg].

These problems are really fine points of accent perfection. They seldom create difficulties in communication, and it would be difficult to justify spending much effort in their elimination.

On the other hand, the reductions in English, increasing as they do, the distance between phonological and phonetic representation, can create difficulties in comprehension for Romanians learning English. This is especially true in the case of the interaction of glottalization and dental loss.

Consider just one example: the difference between can and can't in American English when these forms occur before a consonant :

You can do that ! [kæn]
You can't do that ! [kænʔ]

The difference here between affirmative and negative is simply ʔ .

(In many dialects the problem here is rather more complicated. When unstressed, can is of course [kən] or [kn] or even [ʔʔ], and thus there is no confusion with can't, which occurs with a full vowel. Only when both are stressed does the difference become tricky. A Romanian may thus confuse stressed can with stressed can't. An additional cue useful in this case is the greater nasalization, often with loss of ɱ which occurs in can't but not in can. In the extreme case the difference is really [kæ̃ʔ] v. [kæn].)

Finally, two areas of fruitful further investigation suggest themselves.

1. It would be instructive to investigate the relation of aspiration to glottalization in the languages of the world. It is quite possible that they are somehow linked; that the existence

of glottalized consonants may presuppose the existence of aspirates. Indeed, they both may in some cases alternate manifestations of vocal tract tenseness depending on syllable position.

2. Thus it would be no accident that Romanian lacks both aspiration and glottalization while English has both. This leads to an interesting hypothesis for the teaching of pronunciation; for if the phenomena do in fact reinforce each other, it would make sense to link them in teaching. A Romanian having trouble with initial aspiration may be helped by drilling final glottalization, for example. And an American who has trouble eliminating aspirated consonants may be helped by the correction of [stɪʔs].

SOME REMARKS ON DISYLLABIC STRUCTURES IN ENGLISH AND ROMANIAN

by Hortensia Pârlog

In the present paper we shall compare the consonant sequences of English and Romanian disyllabic words.

An inventory of the main syllabic types was made by analysing the disyllabic words occurring in the corpus of 3000 words used also in the study of monosyllables.¹ In Romanian, of 3000 words, 804 (26,8%) were disyllabic,² in English, of 3000 words, 570 (19%) were disyllabic.

We have identified 67 structures in Romanian and 98 structures in English. Although the number of disyllabic words in the texts is smaller in English than in Romanian, in English there are a greater variety of syllabic structures. A list of these structures in the two languages, with examples, the number of occurrences, and their frequency calculated in percentages of the total number of disyllabic words, will be given at the end of the paper.

1. The most frequent structures in both languages are the following, in decreasing order of frequency :

<u>Romanian</u>			<u>English</u>		
CV - CV	gură	19%	CV - CV	father	12,3%
CV - CVC	merit	10,3%	CV - CVC	village	9,8%
VC - CV	urină	6,81%	CV - OOC	giggled	5,61%
V - CVC	educ	4,96%	CVC - CVC	business	4,4%
CVC - CVC	vindea	4,60%	CV - CVCC	second	3,7%
CVC - CV	halbă	4,49%	VC - CV	answer	3%

Three of the six frequent syllabic types in Romanian end in a vo-

well; the other three end in a single consonant. In English, only two of the frequent syllabic types end in a vowel, while the rest end in one, two, or even three consonants.

2. Fifty-eight English syllable structures do not occur in Romanian; for twelve of these the second syllable is formed of consonants only. The number of syllable structures occurring only in Romanian is 27.

3. The initial syllables that permit the occurrence of the greatest number of syllabic types after them are the same in both languages:

<u>Romanian</u>	<u>English</u>
CV - (+ 14 syllabic types)	CV - (+ 13 syllabic types)
V - (+ 10 syllabic types)	V - (+ 13 syllabic types)
CVC - (+ 9 syllabic types)	CVC - (+ 13 syllabic types)
CCV - (+ 9 syllabic types)	CCV - (+ 8 syllabic types)

The less "adherent" initial syllables are the following :

<u>Romanian</u>	<u>English</u>
CCVV - followed only by -CV (groapă)	VVC - followed only by -CV (only)
CCVVC - followed only by -CV (gloante)	CVCC - followed only by -CV (sixty)
CCCV - followed only by -CVCC (străpuns)	CCVVCC - followed only by -CVCC (spokesman)
	CCCVV - followed only by -CVU (striking)
	CCCVCC - followed only by -CVCC (squinted)

4. The most "adherent" final syllables are :

<u>Romanian</u>	<u>English</u>
- CV (preceded by 12 syllabic types)	-CV (preceded by 14 syllabic types)
-CVC (preceded by 9 syllabic types)	-CVC (preceded by 14 syllabic types)
-CVV (preceded by 9 syllabic types)	-CVCC (preceded by 11 syllabic types)

The less "adherent" final syllables are those which are little "adherent" in initial position as well (except CVVCCG in English):

<u>Romanian</u>	<u>English</u>
-CCVVG (preceded by V-) opream	-CVVCCG (preceded by V-) announced
-CCVV (preceded by VC-) orbea	-CCVVCC (preceded by CVC-) disclosed
	-CCCVC (preceded by CVVC-) widespread

5. The length of disyllabic words varies between three and eight phonemes in Romanian (e.g. V-VC aici, V-CV apă, CVC-CCVCC păstrind, CCCV-CVCC străpuns, CCCVC-CVC splendid) and between three and nine phonemes in English (V-CV other, V-CC often, CVC-CCVVCC disclosed, CVVC-CCCVC widespread, CCVVCC-CVC spokesman).

The consonantal clusters occurring in the disyllabic words of the two languages were studied on the basis of the DLPM and the Concise Oxford Dictionary of Current English, from which we have excerpted all disyllabic words except those marked as obsolete.

Initial and final consonantal combinations of disyllabic words in the two languages do not always differ from the consonantal clusters that occur in the monosyllabic words. In order to avoid a repetition of problems already known from the study of the monosyllables we have compared consonantal clusters occurring in the monosyllabic words with those occurring in the disyllabic words. In the present paper we shall mention only the differences noticed. A full list of the consonant clusters possible will be given in an annex to the paper.

In the Romanian disyllabic words there are more consonant clusters in initial position and fewer in final position than in the monosyllabic words (especially in the structures formed of two members only). On the other hand, in the English disyllabic words the greater number of consonant clusters, as compared to the monosyllables, occurs in final position.

Initial clusters C_1C_2

Besides the clusters occurring also in the monosyllabic

words, the following combinations occur in the disyllabic words:

In Romanian

1. C_1 may be represented also by :

a) [l] , [m] , [v] in the initial cluster $C_1 + l$

E.g. hlizi, mladă, vlagă

b) [ʃ] , [m] in the initial cluster $C_1 + r$

E.g. şrapnel, mearcă

c) [ʃ] in the initial cluster $C_1 + n$

E.g. jnepen

d) [ʃ] in the initial cluster $C_1 + m$

E.g. şmecher

e) [k] in the initial cluster $C_1 + t$

E.g. ctitor

Except [ʃr] , none of these clusters occur in English.

2. C_2 may be represented also by consonants [ʃ] and [g] in the clusters $s + C_2$, $z + C_2$.

E.g. scenă, şgardă

Neither cluster occurs in English.

In English

1. C_1 may be represented also by:

a) [b] in the initial cluster $C_1 + i$

E.g. bugle, bugler

On the other hand [θ] no longer occurs in this position.

b) [g] in the initial cluster $C_1 + w$

E.g. guano

2. The initial cluster $f + θ$ occurs occasionally in the second pronunciation possible of the word phthisis [θaɪsɪs, 'fθaɪsɪs]. All these consonantal groups do not occur in Romanian.

Initial clusters $C_1C_2C_3$ are few in number also in disyllabic words. Nevertheless, in Romanian, their number is twice as great as in monosyllables : C_1C_2 are represented also by the cluster [ʃt] , [sf] [zg] , characteristic for Romanian, while C_3 may

be represented not only by [r], but also by [l], like in English.

E.g. ştrenger, şfredel, zgriptor, zglobiu, sclavă, splendid.

In English the only difference from the monosyllables is the disappearance of the group st + l, and the appearance of sk + l, which exists in Romanian as well.

E.g. sclerous.

Final clusters -C₂C₁

In Romanian, twenty consonant clusters which occurred in the monosyllabic words in this position no longer enter the structures of the disyllabic words. They are: m + t, ts; b, s, ʒ + d; b, n, + z; p + t; r + p, f, ʃ, l, z, + g, f, ʃ, dʒ, v, z. Six new clusters occur though: l + t, g + d, d + v, n + ʒ, m + f, r + h, of which d + v, n + ʒ, r + h do not exist in English.

E.g. impuşti, smaragd, molivd, deranj, triumf, ierarh.

New consonant clusters occur also in English:

- C₂ + n, where C₂ is represented by ten consonants: [p, t, d, k, dʒ, f, v, s, z, ʃ]. (In the monosyllabic words only the cluster + n occurred in the word kiln.)
- C₂ + l, nonexistent in the monosyllables and having a high frequency in the disyllabic words.
- m + b and s + p also occur, as well as C₂ + n, where C₂ is represented by [ʃ] and [z].

E.g. iamb, enclaps, rhythm, prism

The final cluster C₂ + ʒ, quite frequent in the monosyllables, represented only by the group n + ʒ in the disyllabic words.

E.g. millionth

As C₂, [l] has less possibilities to combine in the disyllabic words than in the monosyllables.

Of the clusters discussed here only m + b exists in Romanian; C₂ + n, which occurs in Romanian, is represented by other consonants than in English ([g, r, m]: malign, solemn, etern).

Final clusters C₂C₂C₁

In Romanian the three member final clusters are few in number also in the disyllabic words; but the consonant combinations are different from those occurring in the monosyllables, with the exception of [nkt], [kst].

C₁ is no longer represented by [s] or [m] ; instead [v] occurs in this position.

E.g. *bilingv*

With the exception of [ket] , none of these final groups occur in English.

In English, the three-member final groups are more frequent than in the monosyllabic words; they result especially from the adding of -s or -ed to the disyllabic words. C₃ is represented by seven more consonants as compared to C₂ in the monosyllabic words :

[b, g, dʒ, v, ʒ, z, ʃ].

Half of the final consonantal groups have as segment C₂ consonant [l] , which does not occur in the position in the monosyllabic words, and [n] , which occurs only twice in this position in the monosyllabic words (*kilns*, *kilned*). C₂ may also be represented by [d] ; but [θ] , frequent in this position in the monosyllables, occurs only once in the disyllabic words, while [z, ʃ, tʃ] never occur.

In the monosyllabic words, the voiceless consonants [t] [s] have the greatest frequency as C₁ ; in the disyllabic words the voiced pairs, [d] [z] have the highest frequency.

None of the clusters mentioned here occur in Romanian.

No four-member final clusters were found in either language.

The difficulties which the Romanian speaker has in pronouncing English consonantal clusters are essentially the same with those discussed for the monosyllables. Nevertheless some of the consonantal groups, specific for the disyllables, might present certain difficulties for the Romanian speakers. For the time being, we can predict some errors only. They concern those syllables which are formed only of consonants - two or three in number - as in the case of the final segments C + l, C + n, C + R, or of the three-member final segments, where C₂ is represented by [l] or [n] . As no such clusters exist in Romanian, the Romanian speaker will tend to introduce a vowel, usually [ɪ] or [ə] , between the first and the second consonant or after both.

E.g.

		Probable error
cattle	[kætl]	[kætlɪ] [kætlə]

giggled	[gɪɡld]	[gɪɡld]	['gɪɡɔld]
dimplrd	[dɪmpld]	[dɪmpɔld]	[dɪmplɪd]

In the case of the C + n cluster, the insertion of [ə] between C and n is sometimes suggested by the English Pronouncing Dictionary. (E.g. happen [hæpən] ['hæpən].)

As far as C + m is concerned, if the Romanian speaker does not insert an [ə] between the two consonants, which is accepted by the Pronouncing Dictionary, he will not be able to pronounce words like rhythm or prism as disyllabic words; instead he will change them into monosyllables.

Experiments will undoubtedly reveal more difficulties resulting from successions of consonants nonexistent in Romanian.

We have not dealt with intervocalic clusters in this paper; nevertheless we think that their study will be most helpful from a practical point of view, as it will point out successions of consonantal sounds other than those mentioned so far.

F o o t n o t e s

1. H. Pârlog, Monosyllabic Structures in English and Romanian (presented at the fourth conference of the Project, Cluj, 1972). Samples were selected from the following :
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The Sunday Times, 23 Jan. 1972
 We have or not included certain words in our calculations according to the same criteria which we used in the study of monosyllables.
2. Notice the small number of Romanian disyllabic words as compared to that of the monosyllables (1471). Regarding this problem, cf. Alexandra Rocerio-Alexandrescu, Fonostatistica limbii române, Editura Academiei, 1968, p. 139

Annex 1
Syllabic types

English				Romanian			
Syllabic type	exam- ples	oc- cur- ren- ces	%	Syllabic type	exam- ples	oc- cur- ren- ces	%
1	2	3	4	5	6	7	8
1. -				1.V -VC	aici	6	0.745
2.V -CV	other	10	1.75	2.V -CV	apl	28	3.48
3.V -CVV	ago	3	0.525	3.V -CVV	erai	19	2.36
4. -				4.V -CVVV	aveat	3	0.374
5.V -CVVC	about	11	1.93	5.V -CVVC	aveam	5	0.62
6.V -CVVOC	around	7	1.23	6. -			
7.V -CVVCOO	announ- ced	2	0.351	7. -			
8.V -CVC	again	15	2.54	8.V -CVC	educ	40	4.96
9.V -CVOC	assault	6	1.05	9.V -CVOC	ajuns	9	1.12
10.V -CVCOO	against	2	0.351	10. -			
11.V -CC	even	7	1.23	11. -			
12.V -OCV	every	2	0.351	12.V -OCV	opri	1	0.124
13. -				13.V -OCVO	aflat	1	0.124
14.V -CCVVC	afraid	1	0.176	14.V -CCVVC	oprean	1	0.124
15.V -CCVOC	ap- proves	1	0.176	15. -			
16.V -OOC	iam't	7	1.23	16. -			
17.VV -CV	eighty	7	1.23	17.VV -CV	uite	2	0.249
18.VV -CVV	idea	3	0.525	18.VV -CVV	uinea	1	0.124
19.VV -CVVC	areas	1	0.176	19. -			
20.VV -CVC	acres	1	0.176	20. -			
21.VV -O(V)OC	opened	1	0.176	21. -			
22.VV -OCVVC	eye- brows	1	0.176	22. -			
23.VVC -OV	only	8	1.4	23. -			
24.VC -CV	answer	17	3	24.VC -CV	urma	55	6.81

English				Romanian			
1	2	3	4	5	6	7	8
25.VC -CVV	al-	3	0.7	25.VC -CVV	orbee	5	0.62
	though						
26.VC -CVVC	always	9	1.58	26. -			
27.VC -CVVCC	imposed	4	0.7	27. -			
28.VC -CVC	admit	8	1.4	28.VC -CVC	urcut	10	1.24
29.VC -CVCC	accept	3	0.525	29.VC -CVCC	intorc	4	0.496
30. -				30.VC -CCV	intru	7	0.872
31. -				31.VC -CCVV	intrai	1	0.124
32.VC -CCVC	instead	2	0.351	32.VC -CCVC	unplut	5	0.62
33. -				33.VC -CCVCC	ot-	1	0.124
					stati		
34.VC -CCVVC	implied	1	0.176	34. -			
35. -				35.VCC -CVC	altfel	2	0.249
36.VCC -CVCC	extent	2	0.351	36. -			
37.VCC -CCVVC	explain	1	0.176	37. -			
38.VCC -CCVC	excuse	1	0.176	38. -			
39. -				39.CV -V	fie	9	1.12
40. -				40.CV -VV	siua	14	1.74
41.CV -VC	doing	2	0.351	41.CV -VC	lust	2	0.249
42. -				42.CV -VVC	voian	1	0.124
43. -				43.CV -VCC	fiind	1	0.124
44.CV -CV	daught-	70	12.3	44.CV -CV	gură	153	19
	er						
45.CV -CVV	yellow	6	1.05	45.CV -CVV	cales	18	2.24
46. -				46.CV -CVVV	dureau	5	0.62
47.CV -CVVC	suppose	3	0.525	47.CV -CVVC	ătrean	7	0.27
48.CV -CVVCC	remains	2	0.351	48. -			
49.CV -CVC	village	56	9.8	49.CV -CVC	merit	85	10.3
50.CV -CVCC	second	21	3.7	50.CV -CVCC	pămint	20	2.49
51.CV -CVCCC	relaxed	1	0.176	51. -			
52.CV -CC	subtle	14	2.46	52. -			
53. -				53.CV -CCV	lucru	12	1.49
54.CV -CCVC	between	6	1.05	54.CV -CCVC	reproș	5	0.62
55.CV -CCVVC	patrol	1	0.176	55. -			
56.CV -CCVCC	dif-	2	0.351	56.CV -CCVCC	cuprins	3	0.372
	ferent						

English

Romanian

1	2	3	4	5	6	7	8
57.OV -CCC	giggled	32	5.61	57. -			
58.CVV -VC	dying	2	0.351	58. -			
59.CVV -VCC	highest	2	0.351	59. -			
60.CVV -CV	lazy	8	1.4	60.CVV -CV	teamă	21	2.62
61. -				61.CVV -CVV	pielea	1	0.124
62.CVV-CVC	total	16	2.8	62. -			
63.CVV -CVCC	moment	8	1.4	63. -			
64.CVV -CC	chosen	3	0.525	64. -			
65.CVV -CCV	widely	1	0.176	65. -			
66.CVV -CCVC	hatred	2	0.352	66. -			
67.CVV -CCC	tighten-	1	0.176	67. -			
	ed						
68.CVC -VC	banging	1	0.176	68. -			
69.CVC -VCC	weekend	2	0.352	69. -			
70.CVC -CV	member	16	2.81	70.CVC -CV	halbă	36	4.49
71.CVC -CVV	window	5	0.89	71.CVC -CVV	tîrziu	4	0.496
72. -				72.CVC -CVVV	dormeau	1	0.124
73.CVC -CVC	business	25	4.4	73.CVC -CVC	vindec	37	4.6
74. -				74.CVC -CVVC	sînteam	5	0.62
75.CVC -CVCC	husband	8	1.4	75.CVC -CVCC	convîng	5	0.62
76.CVC -CVCCC	them-	2	0.352	76. -			
	selves						
77.CVC -CC	simple	2	0.352	77. -			
78.CVC -CCV	country	4	0.7	78.CVC -CCV	pentru	25	3.12
79.CVC -CCVC	hundred	7	1.23	79.CVC -CCVC	dispreț	1	0.124
80. -				80.CVC -CCVCC	pă-	1	0.124
					trînd		
81.CVC -CCVVC	destroyed	1	0.176	81. -			
82.CVC -CCVVCC	dis-	1	0.176	82. -			
	closed						
83.CVCC -CV	sixty	1	0.176	83. -			
84.CVVC -CV	lately	1	0.176	84.CVVC -CV	foarte	15	1.87
85. -				85.CVVC -CVV	moartea	2	0.249
86.CVVC -CVVC	lifeline	1	0.176	86. -			
87.CVVC -CVC	soldiers	6	1.05	87.CVVC -CVC	pierdut	2	0.249

English					Romanian			
1	2	3	4		5	6	7	8.
88.CVVC -CVCC	councils	2	0.352		88. -			
89. -					89.CVVC -CCV	noastre	1	0.124
90.CVVC -CCCV	wide-spread	1	0.176		90. -			
91.CVVC -CV	mostly	3	0.525		91. -			
92.CVVC -CVC	child-hood	2	0.352		92. -			
93.CVVC -CVVC	hind-sight	1	0.176		93. -			
94. -					94.CCV -V	stia	3	0.374
95. -					95.CCV -VC	stian	4	0.499
96.CCV -CV	pleasure	9	1.58		96.CCV -CV	slavi	28	3.48
97. -					97.CCV -CVV	crișu	5	0.62
98. -					98.CCV -CVV	plăcu	1	0.124
99.CCV -CVC	bracket	8	1.4		99.CCV -CVC	trăcu	22	2.74
100.CCV -CVVC	prepared	1	0.176		100.CCV -CVVC	spuneau	7	0.872
101.CCV -CVVC	proposed	1	0.176		101. -			
102.CCV -CVCC	student	4	0.7		102.CCV -CVCC	protest	10	1.24
103.CCV -CC	trouble	2	0.352		103. -			
104. -					104.CCV -CCV	sticlă	3	0.374
105.CCV -CCVC	tribute	1	0.176		105. -			
106.CCV -CCC	present	2	0.352		106. -			
107.CCV -VC	playing	1	0.176		107. -			
108.CCV -CV	slowly	2	0.352		108.CCV -CV	gropă	7	0.872
109.CCV -CVC	private	6	1.05		109. -			
110.CCV -CVCC	protests	1	0.176		110. -			
111.CCV -CC	trifle	1	0.176		111. -			
112.CCV -CC	trifles	1	0.176		112. -			
113.CCV -CV	slightly	1	0.176		113.CCV -CV	gleanțe	2	0.249
114.CCV -CVVC	grape-vine	1	0.176		114. -			
115.CCV -CVC	spokesman	1	0.176		115. -			
116.CCV -CV	twenty	6	1.05		116.CCV -CV	stinga	2	0.249

English				Romanian			
1	2	3	4	5	6	7	8
117. -				117.OGVC-OVV	tranzai	4	0.497
118.OGVC-CVC	trumpet	8	1.4	118.OGVC-CVC	afireit	3	0.374
119.OGVC-CVOC	class- rooms	1	0.176	119. -			
120.OGVC -OC	question	2	0.352	120. -			
121.OGVC -OCV	frontier	1	0.176	121. -			
122. -				122.OGVC-CVOC	străpuns	1	0.124
123.OGVC-CVC	striking	1	0.176	123. -			
124. -				124.OGVC -CV	stristă	1	0.124
125.OGVC-CVC	squinted	1	0.176	125.OGVC-CVC	splam-	1	0.124
					did		

Annex 2

English consonantal clusters

Initial clusters C₁C₂

1. p, b, t, d, k, f, v, s, h, m, n, l + j

E.g. pester, bugle, tutor, duty, cupid, future, viewless,
suite, human, museum, newly, lewis

2. p, b, t, d, k, g, f, θ, . + r

E.g. predict, brandy, traffic, drama, creature, grammar,
friendship, threaten, shrivel

3. p, b, k, g, f, s + l

E.g. pleasant, blanket, clatter, glitter, flatter, slander

4. t, d, k, g, s, θ + w

E.g. twenty, dwindle, quiver, guano, sweater, thwarted

5. s + p, t, k, f, m, n

E.g. spider, stable, scaffold, spheric, shoulder, snivel

6. f + θ

E.g. phthisis

Initial clusters C₁C₂C₃

C ₁	C ₂	C ₃	l	r	j	w
s	k		+	+	+	+
s	p		+	+	+	-
s	t		-	+	+	-

E.g. sclerous, scramble, skewering, squalid, splendid,
sprinkle, spurious, stranger, stupid

Final clusters Q₂Q₁

1. $\boxed{b, g, d \int . v, \int , s, \int , n, n, l + d}$

E.g. absorbed, deceived, defamed, garaged, advised,
deluged, enwreathed, abound, behold, intrigued

2. $\boxed{p, t, d, k, d \int . f, v, s, s, \int + n}$

E.g. harden, dungeon, dozen, often, christen, cushion,
hearten, heaven, happen, hearken

3. $\boxed{p, k, t \int , f, s, \int , n, n, l + t}$

E.g. abrupt, abduct, detached, adrift, comert, unmeshed,
undreamt, absent, adult

4. $\boxed{p, b, t, d, k, g, f, s, s + l}$

E.g. apple, pebble, cattle, bridle, ankle, angle, buffle,
whistle, dazzle

5. $\boxed{b, g, v, \int , n, n, \eta, l + s}$

E.g. demobs, carwigs, deceives, enwreathes, betimes,
declines, callings, annals

6. $\boxed{p, k, f, \theta, n, l + s}$

E.g. collapse, climax, digraphs, mammoths, advance, convulse

7. $\boxed{p, k, f, s, n, l + ts}$

E.g. disrupts, delicts, engrufts, disgusts, decants, defaults

8. $\boxed{s, n + p}$

E.g. enclaps, decamp

9. $\boxed{n, l + d \int}$

E.g. arrange, indulge

10. $a, l + f$
E.g. galumph, engulf
11. $\bar{r}, s + a$
E.g. rhythm, prism
12. $s, \eta + k$
E.g. abask, debunk
13. $n + t \}, \theta, dz$
E.g. disbranch, absinth, amends
14. $m + b$
E.g. ismb
15. $l + v$
E.g. involve

Final clusters $-C_3C_2C_1$

C_3	C_2	C_1	t	d	s	s	ts	θ	Examples
p	l		-	+	+	-	-	-	diapled, scruples
p	n		-	+	+	-	-	-	happened, happens
p	s		+	-	-	-	-	-	eclipsed
b	l		-	+	+	-	-	-	doubled, mumbles
t	l		-	+	+	-	-	-	settled, cattles
t	n		-	+	+	-	-	-	heartened, heartens
d	l		-	+	+	-	-	-	addled, bundles
d	n		-	+	+	-	-	-	hardened, hardens
d	s		+	-	-	-	-	-	amidst
k	l		-	+	+	-	-	-	hackled, knuckles
k	n		-	+	+	-	-	-	hearkened, hearkenes
k	s		+	-	-	-	+	-	context, contexts
g	l		-	+	+	-	-	-	giggled, bungles
d	n		-	-	+	-	-	-	dungeons

C ₃	C ₂	C ₁	t	d	s	ts	θ	Examples
f	l	-	+	+	-	-	-	muffled, muffles
f	n	-	+	+	-	-	-	deafened, deafens
v	n	-	+	+	-	-	-	livened, heavens
ʃ	m	-	-	+	-	-	-	rhythms
s	l	-	+	+	-	-	-	bristled, castles
s	n	-	+	+	-	-	-	listened, fastens
s	p	+	-	-	+	-	-	enclasped, enclasps
s	l	-	+	+	-	-	-	dazzled, puzzles
s	n	-	+	+	-	-	-	direned, prisons
s	m	-	-	+	-	-	-	prisms
ʃ	n	-	-	+	-	-	-	options
m	b	-	-	+	-	-	-	iambs
m	p	+	-	-	+	+	-	attempt, decamps, exams
m	f	+	-	-	+	-	-	galumphed, galumphs
n	s	+	-	-	-	-	-	against
n	d	-	-	-	-	-	+	thousandth
n	θ	-	-	-	+	-	-	helminths
n	tʃ	+	-	-	-	-	-	entrenched
n	dʒ	-	+	-	-	-	-	revenged
ŋ	k	+	-	-	+	+	-	adjunct, larynx, adjuncts
l	f	+	-	-	+	-	-	engulfed, engulfs
l	v	-	+	+	-	-	-	involved, evolves
l	dʒ	-	+	-	-	-	-	indulged

Romanian consonantal clusters

Initial clusters C₁C₂

1. b, k, f, g, h, m, p, s, } v + l

E.g. blindat, clipe, fluviu, gloanțe, hlisi, place, slavi,
mleđa, șleampăt, vlagă

2. p, b, t, d, k, g, f, v, } , h, m + r

E.g. predes, bravo, dragă, trage, crișă, grișă, frișă,
vreme, șrapnel, brandă, areandă

3. $p, k, g, s, \{, \} \rightarrow n$

E.g. ppeul, cneessul, gnomio, anocavă, şniţel, jnepeni

4. $s, z, \{, \} \rightarrow m$

E.g. smulge, zmeul, şmecher

5. $k, z, \{, \} \rightarrow v$

E.g. cvartir, zvoni, şvair

6. $k, s, \{, \} \rightarrow t$

E.g. ctitor, stofe, ştiam

7. $s + p, k, f, \checkmark$

E.g. spate, scadent, sfintă, scenă

8. $\checkmark + p, k, f$

E.g. şpalturi, şcoală, şfichiul

9. $z + b, g$

E.g. zborul, zgardă

10. $\checkmark + d, g$

E.g. jderul, jgheaburi

11. $p + s$

E.g. psihic

Initial clusters $C_1 C_2 C_3$

C_1	C_2	C_3	r	l
s	p		+	+
s	k		+	+
s	t		+	-
f	t		+	-

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a	f	+	-
a	d	+	-
a	g	+	+

E.g. sprinten, splendid, scrimă, sclavă, strimă, stronger, sfredel, sdravăn, scripător, aglobiu

Final clusters -C₂G₁

1. p,k,f,s, j ,l,r,n + t
E.g. corrupt, conflict, nolift, belast. impuști, asalt, concert, cuvint
2. s, j ,l,r,n + k
E.g. impușc, arune, incalc, bănesc, incarc
3. p,k,l,r,n + s
E.g. fenix, colaps, impuls, advers, balans
4. g,l,r,n + d
E.g. asaregd, inbold, babord, flămind
5. l,r,n + b E.g. rosalb, adverb, porumb
6. l,r,n + o E.g. incalcui, incarci, adinci
7. s,l,r + n E.g. lirism, cohala(reg.), jandarm
8. g,r,n + n E.g. malign, etern, solemn
9. l,r,n + ts E.g. desculț, divorț, anunț
10. l,n + p E.g. disculp, răstimp
11. r,n + g E.g. catarș, diftong
12. r,n + f E.g. amorf, triumf
13. d,r + v E.g. molidv, rezerv

14. $r, n + \frac{1}{2}$ E.g. recurgi, ejuugi
 15. $n + \frac{1}{2}, j$ E.g. deranj, etanj
 16. $r + h$ E.g. monerh

Final clusters -C₃C₂C₁

C ₃	C ₂	C ₁	t	v
n	k		+	-
k	s		+	-
r	k		+	-
r	j		+	-
n	s		-	+

E.g. adjunct, context, inferet, crenvurst, bilingv

OBSERVATIONS ON THE REALIZATION OF RHYTHM
BY ROMANIAN SPEAKERS OF ENGLISH

by Mariana Popa and
Hortensia Pârlog

When we say about a person that he speaks a foreign language with "a slight accent", says R. Kingdon,¹ the phrase does not actually refer to the wrong pronunciation of the sounds of that language, but to imperfect use of stress, intonation, and, we would say, sentence rhythm.

The difference between English sentence rhythm and that characteristic of Romanian or other Romance languages has been mentioned elsewhere;² English employs a stress-timed rhythm,³ depending on the number of stresses, while Romanian and Spanish⁴ employ a syllable-timed rhythm,⁵ depending on the number of syllables. In Romanian and Spanish there are no perceptible differences between the lengths of the stressed and the unstressed syllables, while in English these differences are very important. Thus in English the utterance of any rhythmic group requires about the same time, irrespective of the number of syllables it contains; in Romanian, the time required for the pronunciation of a rhythmic group is determined by the total number of syllables that form the rhythmic unit. In Romanian a rhythmic unit containing a great number of syllables requires a longer period of time than a rhythmic unit made up of a small number of syllables. Therefore the time necessary for the pronunciation of an English sentence is determined by the number of stressed syllables; the time required for the pronunciation of a Romanian sentence is determined by the total number of syllables, both stressed and unstressed. For example, in English writes, writing, writing it, he

was writing, he was writing it, with an increasing number of syllables - from one to five - are each pronounced in approximately the same interval of time as each contains only one stressed syllable.⁶ In Romanian, different periods of time are required for the pronunciation of rhythmic units containing an identical number of increasing syllables as the English examples: scriu, scriind, scriind-p, el scriesca, el o scriesca.

In order to analyse the way in which the rhythm of the English sentence is realized by Romanian speakers the following method was used: three subjects, marked T,D,B, first year students in English, having Romanian as their native language, were asked to read an English text made up of three sentences. Each subject read the text three times. The text was unknown at the first reading; for the second reading it was thoroughly explained to them; the third reading was made after listening to a model reading by a native speaker of English. In our paper these successive readings are labelled 1,2,3. The texts were tape recorded without the subjects knowing that an experiment was being made.

We have made an auditory analysis of the texts thus obtained, as well as of the model (M); we examined the following phonetic features:

1. the use of pauses (the division into sense groups).
2. the accentuation of words (stressed and unstressed syllables), and the relative pitch of the stressed syllables.
3. the relative length of the stressed and unstressed syllables. We have used the British phonetic notation.⁷ We have rendered the relative length of the syllables by lines of various length: very short /v/, short, / - /, medium, / -- /, long, / --- /. After having established the sense groups on the basis of pauses used, we divided them into rhythmic units. We considered a rhythmic unit to be formed of a stressed syllable and a variable number of unstressed syllables which may precede and follow it.⁸ Unstressed syllables were distributed to preceding or following stressed syllables by employing J.D. O'Connor's rules:⁹

1. All the unstressed syllables at the beginning of a sense group go with the first stressed syllable.

2. If an unstressed syllable belongs to the same word as the stressed syllable, they are grouped in the same rhythmic unit.

3. If the unstressed syllables are closely linked grammatically (syntactically) to the stressed word, they are included in the same rhythmic unit.

4. If there are doubts as to which rhythmic unit an unstressed syllable belongs, it is advisable that it should be grouped after the stress rather than before it.

This method of syllable grouping into rhythmic units and sense groups does not differ significantly from the method mentioned by L. Sfirlea in "Considerații cu privire la ritmul prozei românești".¹⁰

The number of syllables in a rhythmic unit ranges between one and eight in Romanian;¹¹ in English it can be greater than eight.

We have made a comparative analysis of the texts read by the subjects and the model, taking into account the phonetic features (pauses, stresses, syllable length) dealt with during our auditory analysis, as well as the number of rhythmic units, their types, and the time required for the utterance of each sentence. This analysis yielded the following results:

Pauses

The sentence division into sense groups marked by pauses is relatively correct in the short sentences of seven-eight syllables. Numerous mistakes which affect rhythm can be noticed particularly in the longer clauses of sentences, in which several successive determinants occur; the subjects tend to insert a pause before each determinant.

E.g. T₂ wel / if ju 'dount ,maɪnd / ju 'maɪt 'gou tu ʃɔːraɪts
/ænd/ ,ʌsk ,hɪm /ɪf/ ʃɛs 'eni ,njuːs for ʃɔːbʊk /hi
ɪ ɔː / tu ,get fɔː ,aɪ/

The wrongly introduced pauses are of course greater in number at the first reading of the unknown text than at the second reading, when the text is well known. However they do not disappear completely. Let us compare D₁ and D₂ :

D₁ ju ,kæn 'put 'him ɔn ə'leed bi / ,fo: r/ ju ,get ɔn / tu
ʒə ,meɪn 'round/

D₂ 'ju ,kæn 'put 'him ɔn ə'li:d bi ,fo: ju ,get /tu ʒə ,meɪn 'round/

It is interesting to notice that two of the subjects made more mistakes during their third reading than during the second.

The following table shows the total number of pauses wrongly inserted by the three subjects :

	T	D	B
1	11	11	3
2	5	3	2
3	7	4	-

We have not considered a mistake the insertion of a pause, where this is permissible - e.g. delimiting a sense group - even if it does not occur in the model reading.

From the examples given, we notice that the pauses mistakenly used by the subjects do not mark sense groups; nevertheless we can assert that they do not result from the imitation of a Romanian model. In the first reading, the majority of these pauses are a consequence of the lack of familiarity with the text. Their presence in the second, and especially the third reading, is due to the fact that the subjects concentrated on other phonetic features (a good pronunciation of the sounds, the rendering of the intonation as close as possible to that used by the model).

Stresses

The distribution of the sentence stresses is very deficient; the subjects stress almost all the function-words, usually unstressed in English. The most serious mistake seems to be the frequent stressing of the definite article the by subject T.

E.g. T₃ ju 'kæn ,put ,him ɔn ə'li:d

The words him, can, me, was and the there is construction are invariably stressed by all the subjects during all the readings, even after listening to the model.

E.g. T₃ æ:nd 'ʌsk 'hɪm 'ɪf,ʃɛ:s 'eni 'nju:s for ʃə,bʌk
/hɪ,wɔ:z tu 'get fə 'mi:
D₃ænd 'ʌsk 'hɪm /ɪf,ʃɛ:s /'eni,nju:s /əv'ʃæt,bʌk
hɪ,wɔ:z tu 'get,fɔ:,'mi:
B₃ænd 'ʌsk 'hɪm ɪf,ʃɛ:rɪz 'eni,nju:s əv,ʃæt,bʌk hɪ,wɔ:z
tu 'get fə,'mi:

The three subjects do not hear the lack of stress of these words in the model reading. The following monosyllables occur stressed without good reason: the, on, you, to, of, if, and, for, he, in, he's. This wrong stressing cannot be explained by a contrastive analysis of English and Romanian, as neither in Romanian are the article, the conjunction, the preposition and certain pronouns stressed in the sentence.¹²

Sometimes, the subjects give some of the above words a very emphatic stress, not required by the sentence: D₃ "on, T₂ "was, D₂ "me, B₂ "him.

E.g. D₃ ju'kæn 'put 'hɪm "ɔn ʃə"li:d

At other times, they combine stress with a rising or falling pitch, thus producing a nucleus: T₁ ,ɔ:ɔn, 'mi: T₂ 'mi:,D₁ 'mi:
B, him.

E.g. T₁ ju'kæn 'put 'hɪm ,ɔ:ɔn ʃə,li:d

In correct English, the polysyllabic function-words maintain, as a rule, the stressed syllable at the same pitch as the preceding syllable; in our experiment, they get an unwarranted prominence, as the pitch used for the stressed syllable is very high:

T₁ bɪfɔ: ,D₁ bɪfɔ:r,T_{1,2,3} 'eni,D_{1,2,3} 'eni or even 'eni,B_{1,2,3} 'eni.

E.g. T₁ j 'kæn 'put 'hɪm ,ɔ:ɔn ʃə,li:d /bɪfɔ:r ju, get / tu
ʃə /meɪn,roud/.
D₂ /ænd ' : sk 'hɪm ɪf,ʃɛ:s/'eni/√nju:s/

The consequence of this imperfect accentuation is that the rhythmic units modify their structure, and therefore their number is greater for the Romanian speaker than for the English speaker.

Number of rhythmic units

We have seen that the pauses mistakenly used by the subjects do not delimit sense groups. Therefore our remarks concerning the number of rhythmic units are based on a comparison of the number of rhythmic units within each sentence and not within the sense group.

In the first sentence, M. has two sense groups, the first containing just one rhythmic unit, the second containing three rhythmic units. The second sentence is also made up of two sense groups, one containing two rhythmic units, the other four. The third sentence was uttered as one sense group, with eleven rhythmic units.

Here is a comparative table of the number of rhythmic units occurring in each sentence read by the subjects and by the model:

Sentence 1 (9 syllables)					Sentence 2 (15 syllables)					Sentence 3 (27 syllables)				
M	T	D	B		M	T	D	B		M	T		D	B
4					6					11				
1.	5	6	5		1.	12	9	8		1.	17+1 atomic		22	15
2.	4	5	5		2.	9	8	12		2.	12+2 atomics		19	20
3.	4	4	5		3.	10	9	7		3.	16		17	17

We notice immediately that while in the second and the third sentence the differences in the number of rhythmic units are striking, in the first sentence the number of rhythmic units is identical or almost identical with that of the model reading. This could be explained by the identity of the grammatical and phonetic structure of the sentence in the two languages:

Oh 'yes, he's 'very'good in the'street.

O da, e 'foarte 'bun pe 'stradă.

The type of rhythmic units

For the whole text read by the subjects, the most frequent rhythmic units are ones formed of either a single stressed syllable /-/, or of two syllables, /-/-/ (iamb), /-/-/ is more frequent

than /-/. The subjects begin their reading by stressing each English monosyllable and gradually shift to iambic rhythmic units.

E.g. T₃ Wel/ if you don't mind/ you might go/ to Wright's /
and ask him if there's any news of that book/ he was
to get for me/

	Total of rhythmic units	Rhythmic unit /-/	Rhythmic unit /-/-/
T ₁	35	19	9
T ₂	29	11	9
T ₃	31	17	9
D ₁	37	25	6
D ₂	32	16	8
D ₃	30	14	10
B ₁	28	12	7
B ₂	37	23	7
B ₃	29	11	8

The frequency of the mistake of realising rhythmic units formed of one stressed syllable is hard to explain on the basis of a comparison with Romanian; on the one hand the rhythm of literary Romanian rejects the succession of two stressed syllables,¹³ and on the other hand the most frequent type of rhythmic unit in Romanian is made up of two syllables, with a great preponderance of the trochees.¹⁴ The frequency of the occurrence of the iambic rhythmic unit /-/-/ could be explained as resulting from the frequency of occurrence of the trochaic rhythmic unit /- / in the Romanian sentence. At first sight such a conclusion seems paradoxical. If, however, we apply to our sentences the rule for rhythmic unit division considered by L. Sfirlea to be best suited for Romanian (any rhythmic unit begins with the first stressed syllable and carries with it all the following unstressed syllables until the second stressed syllable is reached),¹⁵ then we obtain trochaic rhythmic units /- / for all our previous iambic rhythmic units /-/-/, the frequency of occurrence of the rhythmic unit /- / remaining unaltered. Consequently, the frequency of /-/-/ in the speech of Romanians may be considered a clear case of interference.

Length of syllables

In English, according to J.D.O'Connor,¹⁶ all unstressed syllables preceding the stress are said very quickly. The unstressed syllables after the stress are given the same amount of time as the stressed syllable. The stressed syllable and the following unstressed syllable(s) share the amount of time which a single stressed syllable would have. The stressed syllables which are not followed by unstressed syllables are given full length. All these variations in the length of syllables determine the succession of rhythmic beats (of stresses) at equal intervals of time.

Besides stressing very many function-words, the subjects T, D and B fail to reduce the length of unstressed syllables preceding a stressed one. The weak forms of words are used only accidentally. You is invariably /ju/, never /jə/. The same holds true for of, to and and, which are invariably pronounced /ɔv/, /tu/, /ænd/. There is pronounced in different ways, but never /ðə/ or /ðəz/.

Some unstressed syllables, notably those which follow a stressed one within a word, are correctly reduced in length, but they acquire an inappropriate prominence because of the use of the Romanian sounds /i/, /u/ and /o/ instead of /ɪ/, /ʊ/ and /ɔ/ or /ɔ:/. Even when unstressed and correctly reduced in length, the syllables /rɪ/, /nɪ/, /bɪ/, /tɔ:/ in the words very, any and before, as well as the words in, to, he, you and for acquire undue prominence owing to the quality of the vowel sounds.

E.g. T₂ bi fo ju get tu ʒə neɪn roun

D₁ his veri gaɪd in ʒə stri:t

The subjects T and D give full length to the stressed syllables which are not followed by unstressed ones, but length is incorrectly realized:

1. by diphthongizing a pure vowel

E.g. T₁ gaɪd, stri:t

the result being rising diphthongs with the prominence on the second element of the diphthong;

2. by using long Romanian vowel sounds instead of the short ones;

e.g. D₁ gaɪd

3. by using rising diphthongs; e.g. T₁ maɪnd;
4. by creating some new triphthongs;
e.g. D₃ raɪts, in which the second element is closer than the first;
5. by changing monosyllabic words into disyllabic words;
e.g. D₁ stri:it. B₂ li:ɪd.

A list of the mistakes made in lengthening the stressed syllables not followed by unstressed ones is given below.

T₁ guɪd stri:t maɪn maɪnd raɪts njuɪs
T₂ maɪnd
T₃ guɪd raɪts
D₁ ʒes guɪd stri:it leɪd maɪt raɪts njuɪs
D₂ ʒes maɪnd ʒes raɪts njuɪs
D₃ raɪts njuɪs

In the speech of subject B all syllables are of approximately the same, medium length —. This subject fails both to lengthen and to reduce the length of syllables. Any attempt made by this subject to lengthen a syllable immediately changes the monosyllabic words into disyllabic words, in which the two syllables are of equal length : li:ɪd raɪts.

The mistakes made by the subjects T and D in giving full length to syllables and the incapacity of subject B to perceive length variations can be explained by comparing the base and target languages : in Romanian there are no perceptible variations of syllable length.

Time required for uttering the sentences

The timing of the recorded sentences is represented in the table below; the time is given in seconds.

Sentence 1 (9 syllables 4 stresses 1 pause)	M	T ₁	T ₂	T ₃	D ₁	D ₂	D ₃	B ₁	B ₂	B ₃
	2	3	2	2	3	2	3	2	2	2
Sentence 2 (15 syllables 6 stresses 1 pause)	2	5	3	3	5	4	3	5	4	2
Sentence 3 (27 syllables 11 stresses - pause)	5	10	8	7	10	8	7	7	6	6

A comparison between the time taken for uttering the three sentences by the subjects and the model partly confirms our previous findings. At their first reading it takes T₁ and D₁ almost twice the time to utter the second and the third sentence as compared to M. At their second reading the time required is shorter, but it is still longer than that of the model. The reduced time of T₂ and D₂ may be accounted for by a more judicious use of the pauses. In the first sentence the time of the subjects is close to the time of the model. Here again we have a confirmation of our auditive analysis. We have already shown that the number of phonetic mistakes made by the subjects in reading the first sentence was smaller than for the third and second sentences. This has been explained by the similarity of structure between the English and the corresponding Romanian sentence. The English sentence contains only three very short unstressed syllables: he's, in, the, which were, generally, correctly uttered by the subjects at their second reading. The time required for the third reading was shorter than that required for the second reading by the subjects T and D. However both subjects required more time than the model even at their third reading. The auditive analysis has shown that the subjects are not able to perceive the unstressed syllables and the reduction in length of the unstressed syllables in the model reading; so at their third reading the subjects continued to stress the syllables that were not stressed by the model reader and continued to give full or medium length to the majority of unstressed syllables. But on this third reading the subjects in-

creased the tempo of speech. They seemed to realize that their time was different from that of the model and tried to reduce the difference by accelerating the tempo of speech, without perceiving the other phonetic features which contribute to the realization of English rhythm. Subject B behaved somewhat differently; she did not lengthen any syllable, and reductions in length were only incidental with her. All her syllables were medium to short in length. Tending not to lengthen any syllable and to omit pauses altogether, subject B obtained a shorter time at her first and second reading than subjects T_{1,2} and D_{1,2}; nevertheless the amount of time is still greater than that of the model. Preserving all the peculiarities of her speech unchanged, subject B, too, increases the tempo of her speech during her third reading, thus obtaining a time equal or almost equal to that of the model.

In addition, it must be noticed that the jerky effect of the subjects T, D, B is partly due to the fact that all three articulatory stages are present in the production of final plosives followed by other plosives at word boundaries.

E.g. before you get to the main road; news of that book. A second experiment was made, in which an English dialogue learnt by heart by the same subjects was tape-recorded. three recordings were made, the subjects changing the parts played in the dialogue. The results obtained by applying the same methods as in the first experiment closely correspond to those of the first experiment.

Conclusions

Several factors contribute to the mistaken realization of English rhythm by Romanian speakers of English. Some of them are the result of negative transfers from Romanian - syllable length, the high frequency of the iambic rhythmic unit /v-/. Others - pause, distribution of stresses - are hard to explain, as they have been insufficiently studied. We consider that the testing of a greater number of subjects and the use of phonetic apparatus in the analysis of the recordings would elucidate some of the problems raised by the present paper, and would perhaps confirm our remarks giving them a more general character.

F o o t n o t e s

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K.Pike, The Intonation of American English, Ann Arbor, The University of Michigan Press, 1965, p.34
3. D.Chitorean, op.cit., p.168; K.Pike, op.cit., p.34
4. D.Chitorean, op.cit., p.168
5. K.Pike, op.cit., p.34
6. Cf. J.D.O'Connor, Better English Pronunciation, Cambridge University Press, 1967, p.124 & foll.
7. A.C.Gimson, An Introduction to the Pronunciation of English, Ed. Arnold (Publishers), 1972
8. J.D.O'Connor, Better English Pronunciation, p.125-126
9. Idem, p.126
10. L.Sfirlea, Considerații cu privire la ritmul prozei literare românești, în Studii de limbă literară și filologie, Ed. Academiei, București, 1969, p.94-95
The author indicates two methods of rhythmic unit grouping. According to the first method, the rhythmic unit includes the first stressed syllable and all the previous unstressed ones; the final unstressed syllables are not taken into consideration. According to the second method the rhythmic unit includes the first stressed syllable and all the unstressed ones that follow it. The unstressed syllables preceding the first stressed one are considered to form an incomplete foot. Our method corresponds to the first method mentioned by L.Sfirlea. We preferred the first method because it does not destroy the morphological unity of the word and takes into account the syntactic relations between words.

11. L.Sfirlea, op.cit., p.125
12. Gramatica limbii române. vol.II, Ed. Academiei, București, 1966, p.470-471
13. L.Sfirlea, Pronunția românească literară, Stilul scenic, Ed. Academiei, București, 1970, p.194
The same happens in English, where a stressed syllable loses its stress if followed by another stressed syllable (A.C.Gimson, op.cit., p.259)
14. L.Sfirlea, Considerații cu privire la ritmul prozei literare românești, p.125
15. Idem, p.95
16. J.D.O'Connor, Better English Pronunciation, p.121-127.